IRON & COAL

THE IRON AND COAL TRADES' REVIEW

VOL. 182 | Offices: John Adam House, 17-19, John Adam Street, London, W.C.2 | Registered as a Newspaper
No. 4,830 | LONDON: FRIDAY, FEBRUARY 10, 1961 | [illegible]

GETTING THINGS DONE

8 coking plants put to work during 1960

4 NEW INSTALLATIONS

Appleby-Frodingham III (Third Installation)
APPLEBY-FRODINGHAM STEEL COMPANY

Bairds II (Second Installation)
BAIRDS & SCOTTISH STEEL LTD.

Lysaght V (Fifth Installation)
JOHN LYSAGHT'S SCUNTHORPE WORKS LTD.

Redbourn III (Third Installation)
RICHARD THOMAS & BALDWINS LTD.

4 REBUILDS

Cardiff IR (Fourth Stage)
GUEST KEEN IRON & STEEL COMPANY LTD.

Colvilles IR
COLVILLES LTD.

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THE LANCASHIRE STEEL CORPORATION LTD.

Smithywood IR (First Stage)
NATIONAL COAL BOARD, NORTH EASTERN DIVISION

AND WE ARE NOW BUILDING A FURTHER 5 NEW COKING PLANTS AND REBUILDING 3 OLD ONES

WOODALL-DUCKHAM
CONSTRUCTION COMPANY LTD
Woodall-Duckham House · 63-77 Brompton Road · London · S.W.3
Tel: KENsington 6355 (14 lines) · Telegrams: Retortical (Southkens) London
A MEMBER OF THE WOODALL-DUCKHAM GROUP OF COMPANIES

W-D

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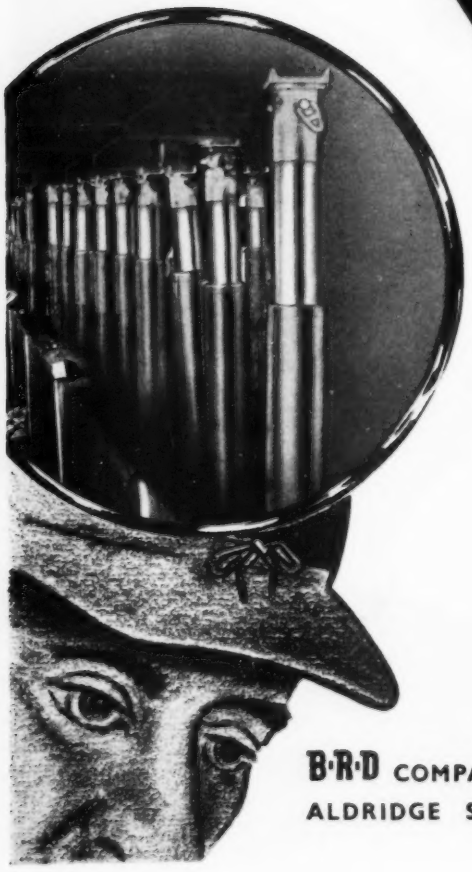
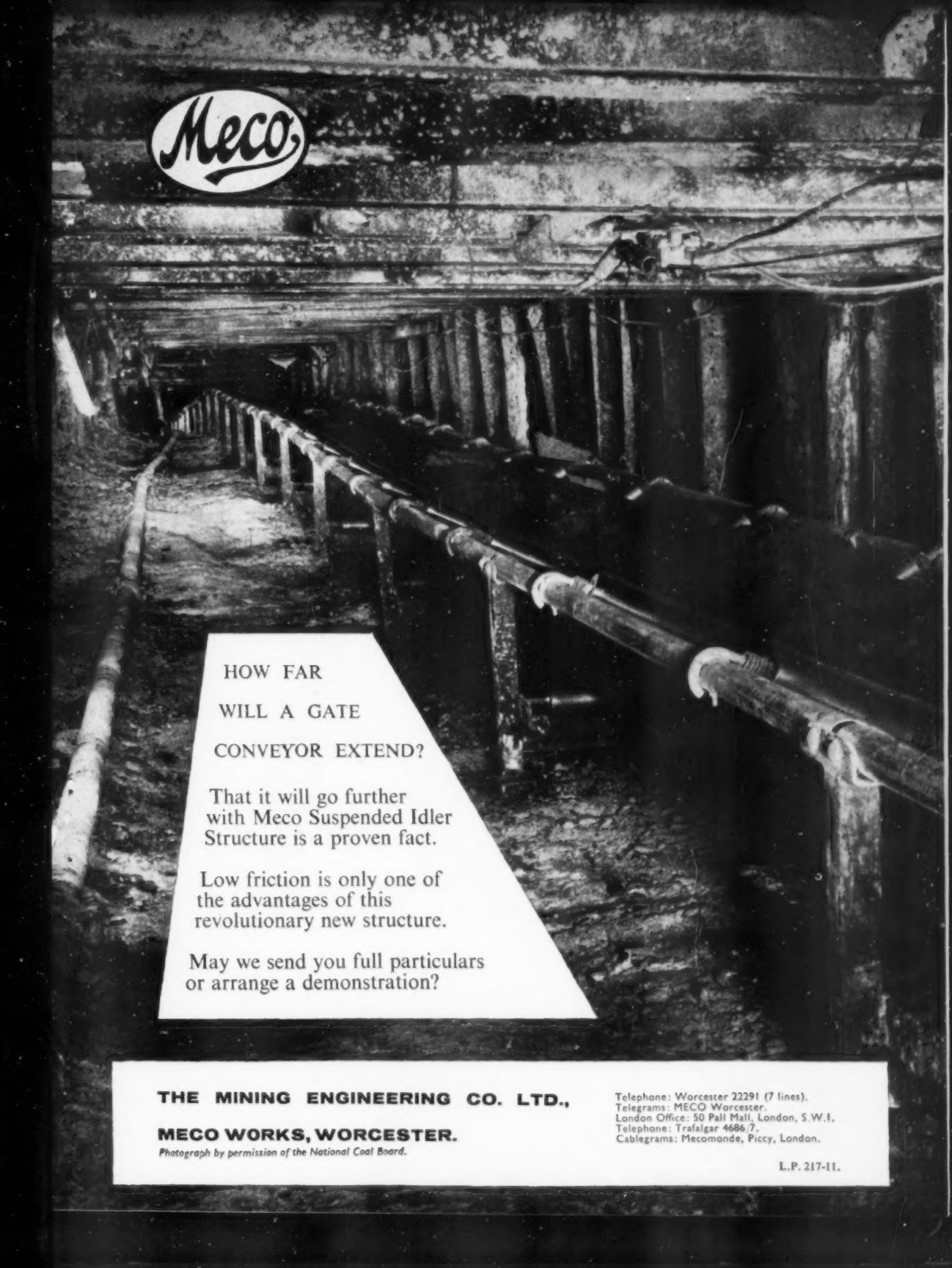


B·R·D COMPANY LIMITED
ALDRIDGE STAFFS ENGLAND

A MEMBER OF THE GKN GROUP OF COMPANIES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HOW FAR
WILL A GATE
CONVEYOR EXTEND?
That it will go further with Meco Suspended Idler Structure is a proven fact.
Low friction is only one of the advantages of this revolutionary new structure.
May we send you full particulars or arrange a demonstration?

THE MINING ENGINEERING CO. LTD.,

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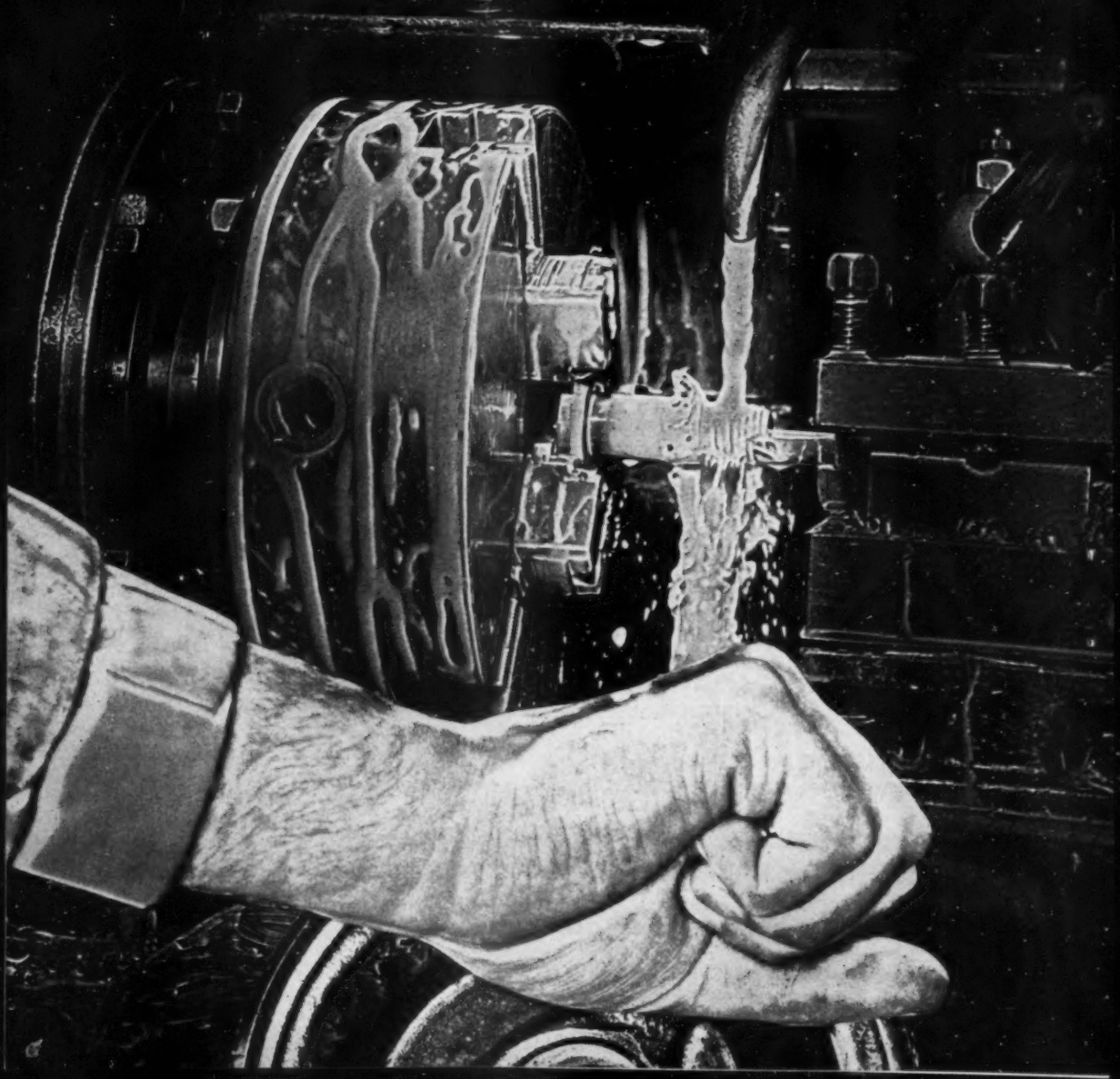
Greater safety for hands



TRIUMPHS OF SHELL RESEARCH

With new Shell Dromus Oils

Most modern soluble cutting oils contain phenolic compounds used as coupling agents between the oil and the emulsifier, for better blending and easier mixing. These phenolic compounds can cause skin irritation, especially where modern high-speed machines are used and the emulsion can concentrate, through the evaporation of water, above the safety level.

Shell research chemists have been working on this problem, which has been causing some concern to Management. After considerable research, Shell Dromus Oils have been reformulated and these new cutting oils now produce bland emulsions, which considerably reduce the risk of skin trouble to operators.

The real difficulty was to find a new coupling agent to replace the phenolic compounds, and Shell finally used what their chemists know as a higher fatty alcohol complex. This solved one problem, but presented another. The new coupling agent was volatile at the high temperatures normally used in blending processes. Further research found a solution to this problem by designing and installing new plant.

The new Dromus Oils are every bit as efficient as before and cost no more. They put Management in the welcome position of being able to minimise working hazards at no extra cost. And machine men need no longer be so worried about skin troubles.

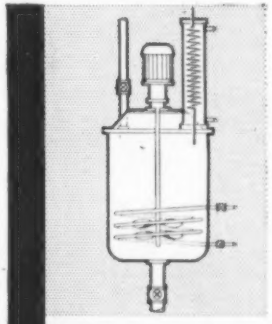
The moral of the story is that Shell research is supremely applicational. The centre at Thornton is always ready to work with even the most specialised sectors of industry to produce the right oil for the job. If you and your organisation have any major lubricating problems, it pays to get in touch with your local supplier of Shell Industrial Lubricants.

The Research Story

Shell chemists in the U.K., in Holland and in the U.S.A., prepared and examined hundreds of experimental soluble oils, and established that certain combinations of fatty alcohols could be used in place of phenolic compounds with no loss of efficiency. They set to work to discover the best combination and developed a higher fatty alcohol complex which fitted exactly. Then they realised that to blend this new coupling agent into soluble oils would require special plant and new blending techniques.

Exhaustive testing of blend stability, emulsion stability, anti-corrosion and machining properties led to selection of the most promising blends. A pilot plant was set up to produce batches of these for use in field trials.

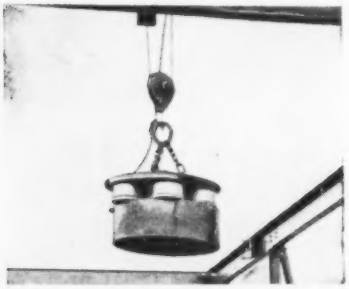
This field testing and final development proceeded for two years whilst production plants were erected at points so chosen as to give the most economical and rapid delivery throughout the United Kingdom.



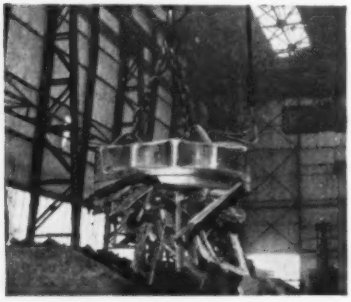
This is the blending kettle. The reflux condenser beside the stirrer motor prevents the loss of constituents volatile at the blending temperature.

NEW SHELL DROMUS SOLUBLE CUTTING OILS

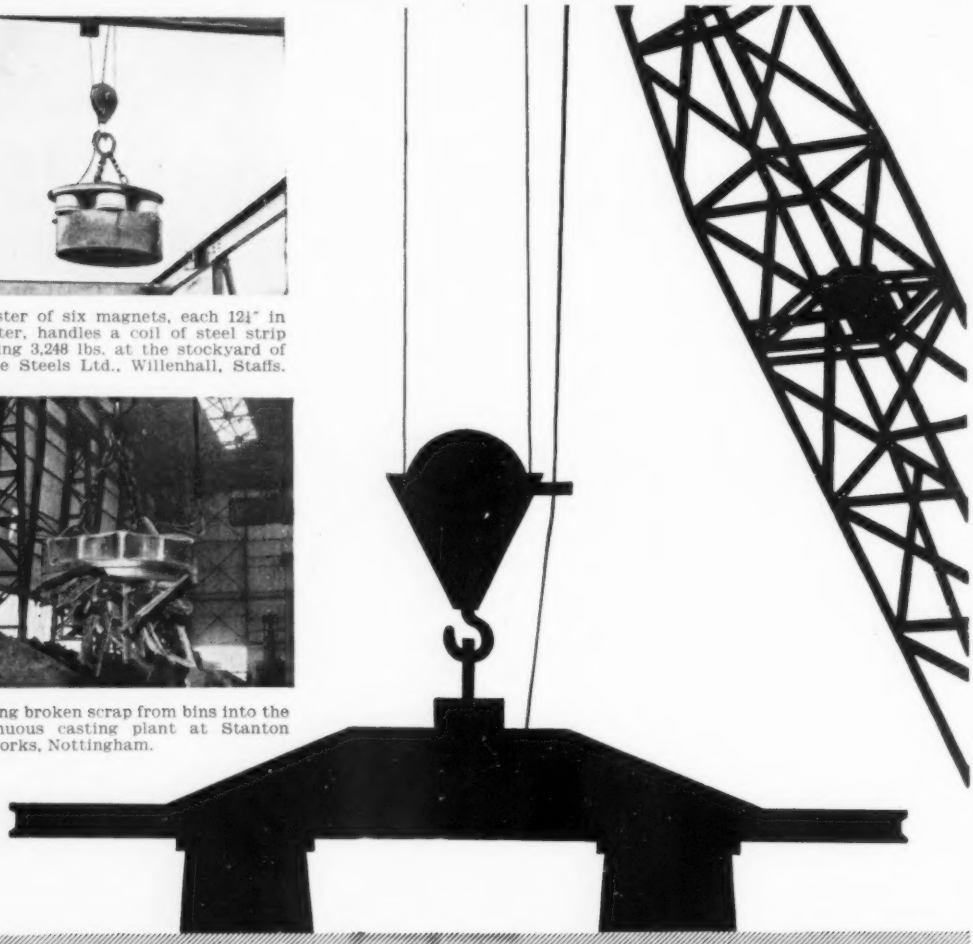
another proof of Shell leadership in lubrication



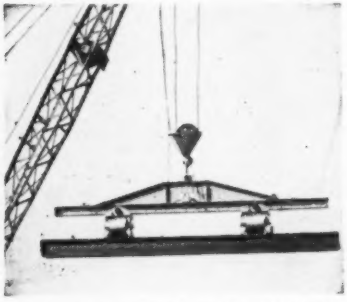
A cluster of six magnets, each 12¼" in diameter, handles a coil of steel strip weighing 3,248 lbs. at the stockyard of Ductile Steels Ltd., Willenhall, Staffs.



Loading broken scrap from bins into the continuous casting plant at Stanton Ironworks, Nottingham.



WITTON-KRAMER LIFTING MAGNETS FOR EVERY JOB



Two bi-polar magnets on spreader beam lifting rolled steel joist.

Whether handling hot steel billets and ingots or salvaging metal from under water, Witton-Kramer electric magnets do the job superbly. Circular, rectangular or bi-polar, G.E.C. makes them all with coils designed and constructed to withstand heavy duty and shock loads. All Witton-Kramer magnets are easily maintained and quickly serviced.

RELY ON THE EXPERIENCE OF G.E.C.

THE GENERAL ELECTRIC COMPANY LIMITED OF ENGLAND · WITTON-KRAMER DIVISION · BIRMINGHAM 6

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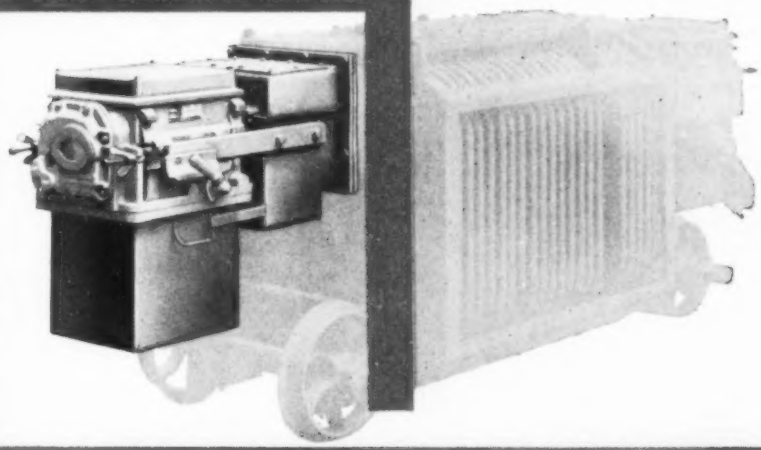

TYPE-F4 3·3-kV 25-MVA circuit-breakers and adaptors have been designed to comply with the National Coal Board Standard Specification P108/P109—1954. They are suitable for use with any transformer complying with the specification. They have direct-acting earth-fault protection, injection-test of earth-fault protection, and cable-adaptors for all makes of flit-plugs

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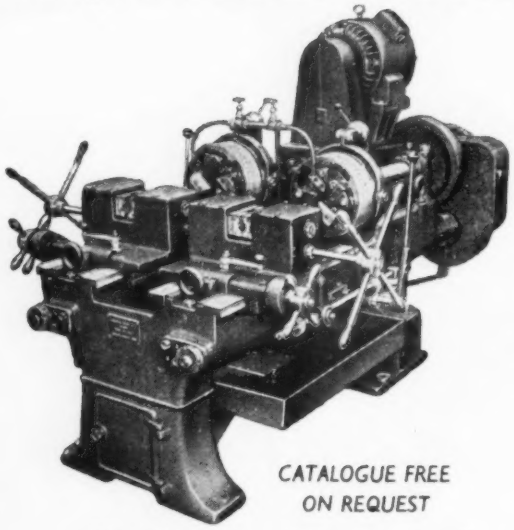
HEBBURN · COUNTY DURHAM · ENGLAND

Heap's Patent Screwing Machines with Tangential Dies



- They are designed from beginning to end as high-class Machine Tools and embody features not found in any other make of Screwing Machines.
- The Die Head is of our own Patented Design.
- All parts of the Head and also of the Die Holders which are liable to wear, are of hardened Steel.
- The wall of metal which surrounds Die Holders solidly supports them, and also eliminates the danger of the Operator being caught by protruding Die Holders.
- The four throw Cam fitted with Hardened Steel Strips.
- The Hardened Steel Contact Blocks of the Die Holders bear their full width on the Cams.

These features render the Die Head when closed as rigid as a solid Die, and enable us to guarantee the Heads to screw perfectly parallel and uniform threads.

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Joshua Heap & Co., Ltd.,
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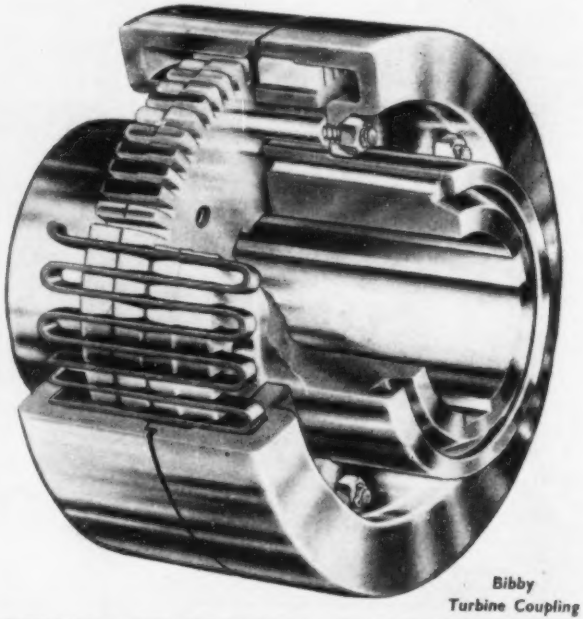
The BIBBY *Resilient* COUPLING

World famous for outstanding performance and reliability. Made in a wide range of types, all employing the same basic principle of Bibby design.

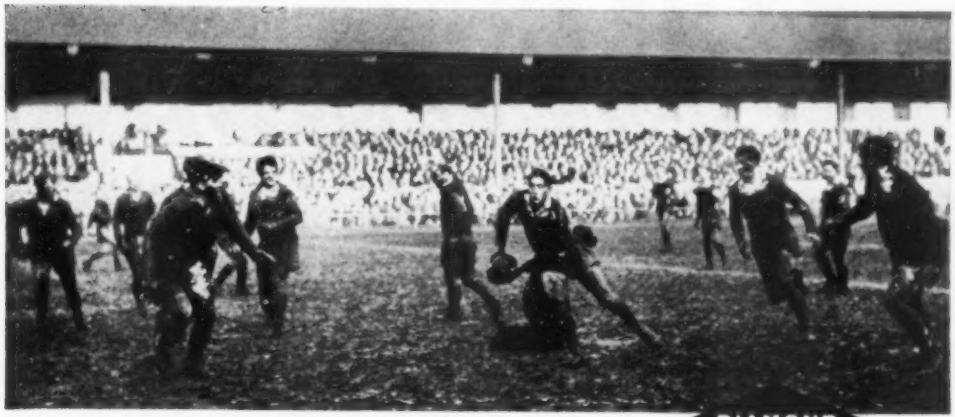
Special types include: Brakewheel, Cardan Shaft, Turbine, Shear pin, Controlled Torque, Spacer and others.



Bibby Turbine Coupling

THE WELLMAN BIBBY COMPANY LIMITED, PARNELL HOUSE, WILTON ROAD, LONDON, S.W.1

where **wet** conditions are a hazard



Photograph by courtesy of Hull Daily Mail

DIAMOND TYPE

Fenaplast COLLIERY CONVEYOR BELTING

is the answer!

Like international forward John Whiteley,
Fenner Diamond type belting is a top-class performer under all conditions.
Why? Because the handling ability of Diamond belting is backed by a cover defence that withstands even the injurious attack of mine water.
The all-round strength of this new range of colliery conveyor belting eliminates breakdowns in vital movements—
puts an end to the penalty of production losses.
It is proving a winner in all tests . . . especially where wet conditions are a hazard.

RANGE OF DIAMOND TYPE BELTINGS AVAILABLE					
N.C.B. APPROVAL NO.	150	158	149	158 HD	149 HD
TYPE	LIGHT DIAMOND	STANDARD DIAMOND	DOUBLE DIAMOND	HEAVY DIAMOND	EXTRA HEAVY DIAMOND
BREAKING LOAD MINIMUM PER INCH WIDTH	2000 LB	2000 LB	2500 LB	3000 LB	4000 LB
THICKNESS	7½ mm	8 mm	8 mm	8 mm	9 mm

J. H. FENNER & CO. LTD. HULL

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BLANTYRE
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TELEGRAMS—PROGRESS TELEPHONES—BLANTYRE 3582, 3583, 3584

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"BLANTYRE NELSON—DAVIS"

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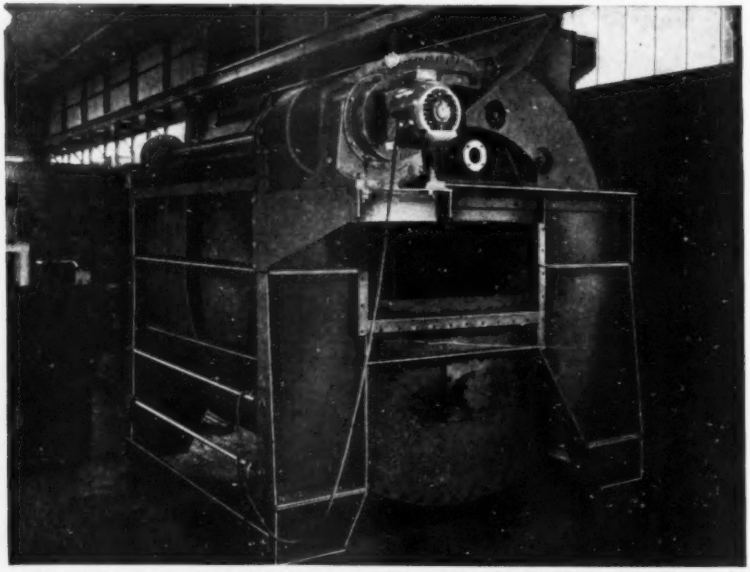

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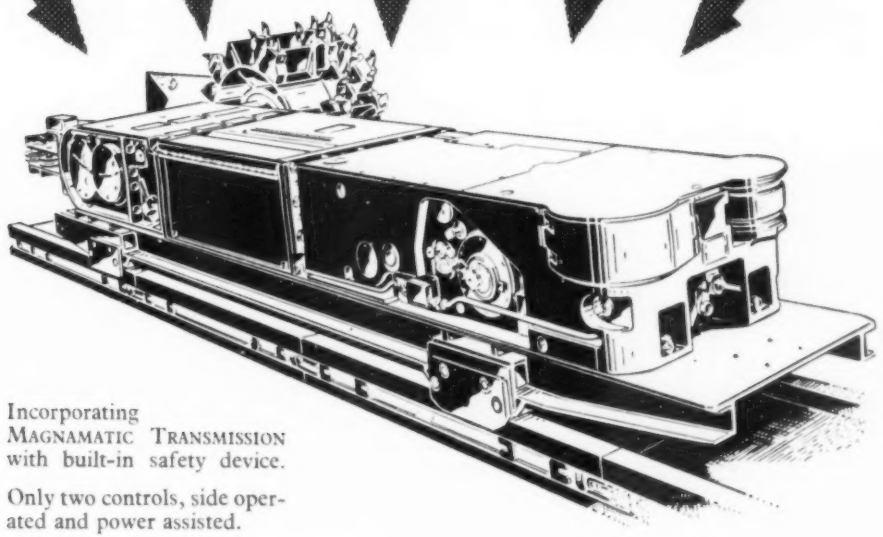

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Only two controls, side operated and power assisted.

BJD 125 hp Shearer

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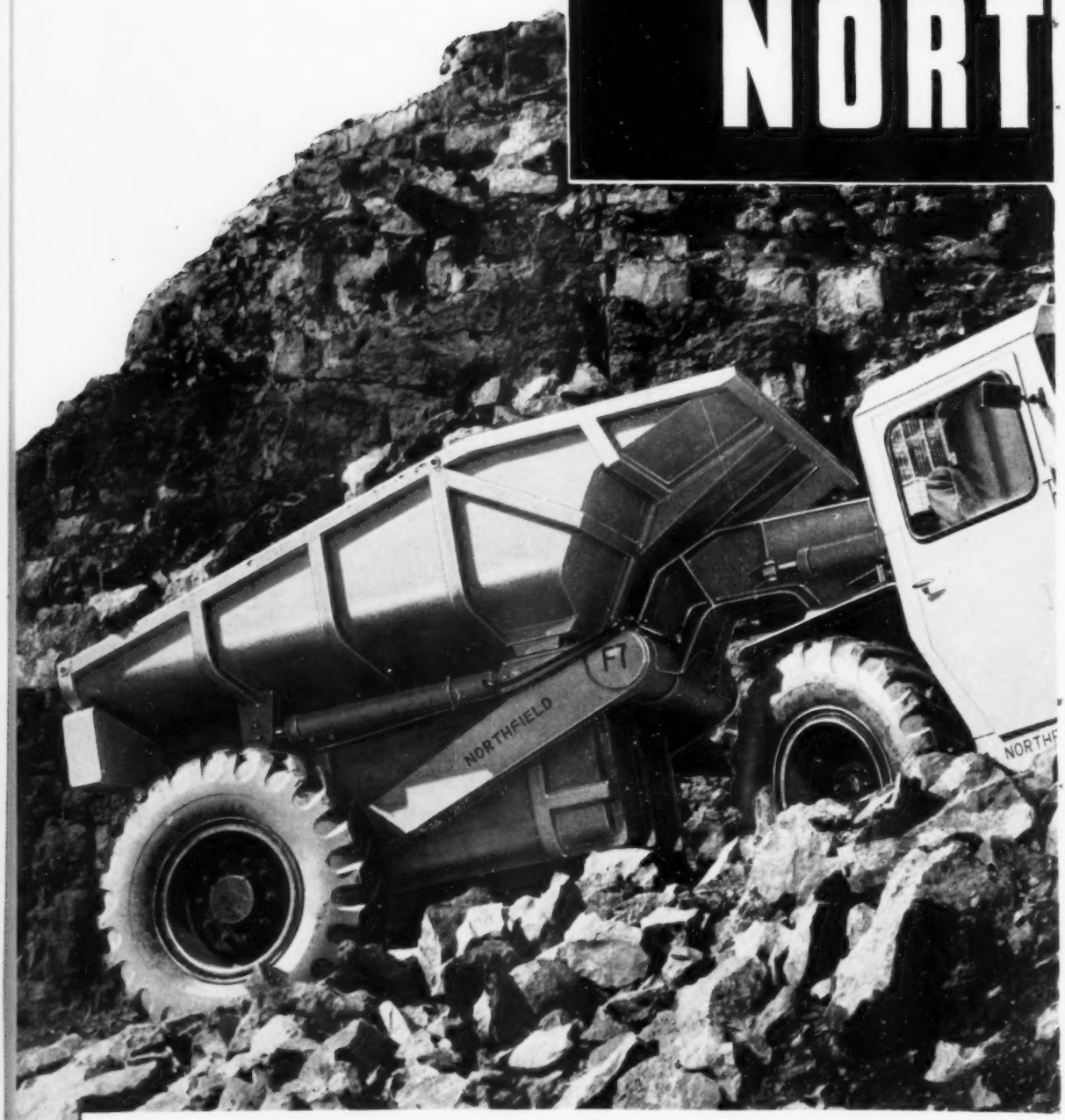

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incomparable in value and performance

- Extremely manoeuvrable, 18ft. 9in. dia. turning circle
- Torque converter and epicyclic gear box
- 2 pedal control
- High Braking factor (6 brakes in all)
- Low running costs and prolonged tyre life
- Struck load 7 cu. yds. heaped 8 cu. yds. SAE ratings

- Road speed 28 m.p.h.
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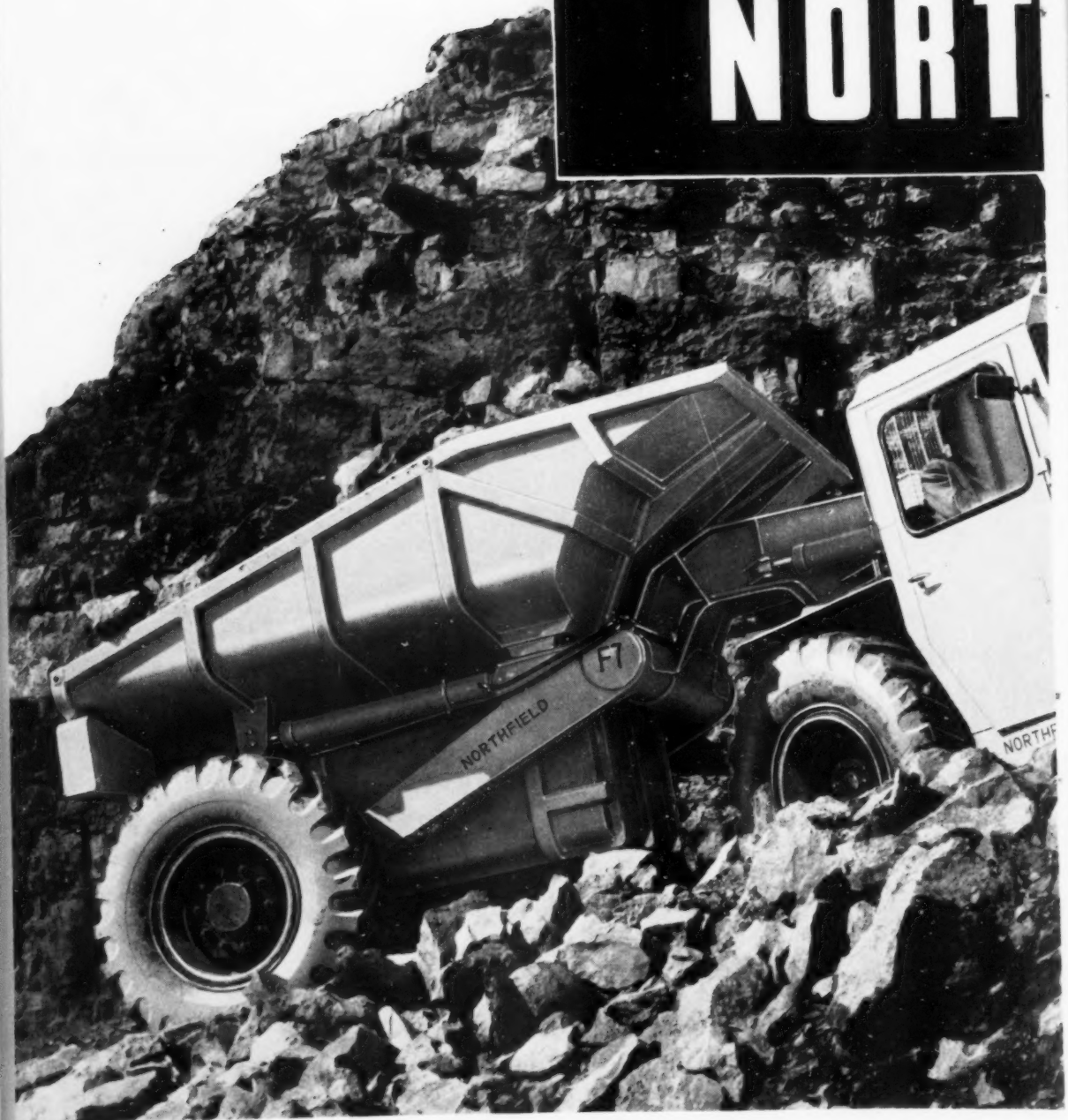

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. . . you must be the chap who suggested we change our conveyor belting—to belting reinforced with HIGH-TENACITY RAYON. An excellent idea. Well done!

Conveyor belts with HIGH-TENACITY RAYON have—high resistance to impact, heat and stretch.
Greater flexibility.
A high strength-to-weight ratio—3 or 4 plies do the work of 5 or 6.

They're thinner, too, and space-saving—important underground where space is precious.

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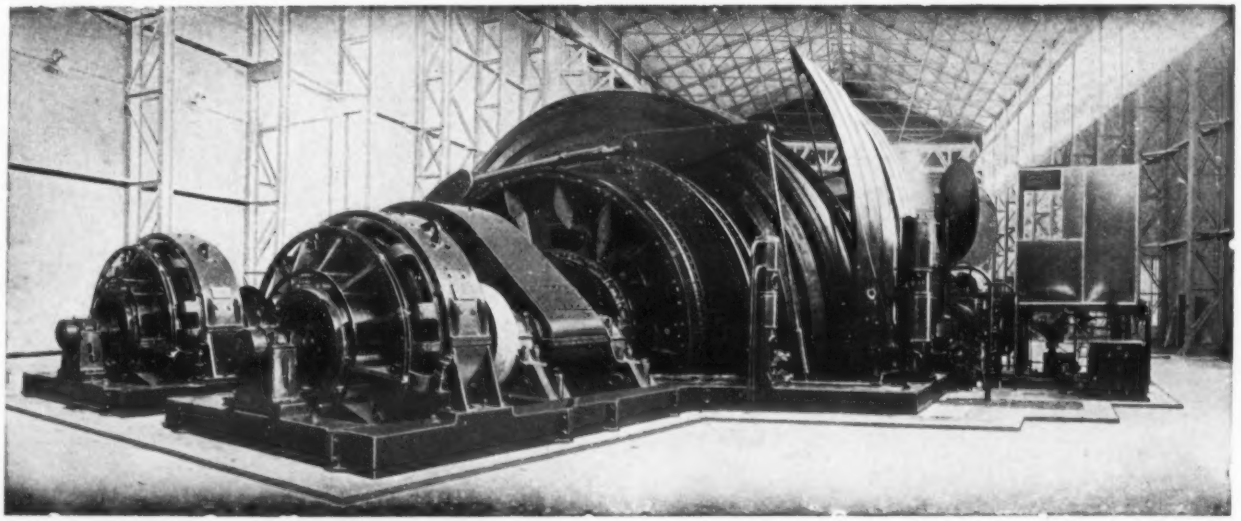
Fullerton, Hodgart & Barclay, Ltd Paisley Estd. 1838

AIR COMPRESSORS
VACUUM EVAPORATORS

Steam and Electric
WINDERS

HYDRAULIC PLANT
GENERAL ENGINEERING



Gear Driven Double Central Drum Electric Winder. Drums 13/30ft. dia. Depth of wind 5,200ft. Vertical. This large Winder was one of two recently installed in South Africa.

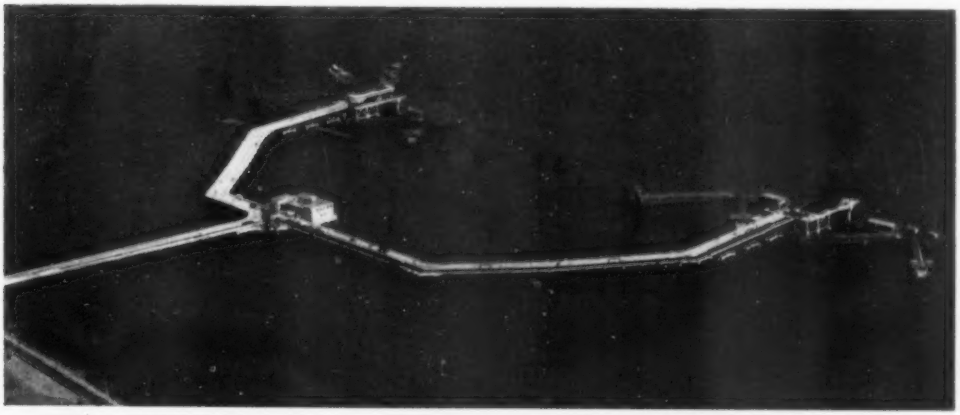
Illustrated Catalogues will be sent on request

THE BONSER HYDRAULIC RAM

A HYDRAULIC RAM built to give reliable service under the worst pit conditions. Material and design specifications of the highest standard.
Total Thrust 3·15 Tons at 1000 PSI
Piston 2″ Diameter
Tube 3″ inside, wall thickness $\frac{1}{4}$″

BONSER TRISTRAM LTD

WATNALL ROAD HUCKNALL NOTTS. Tel: Hucknall 2261



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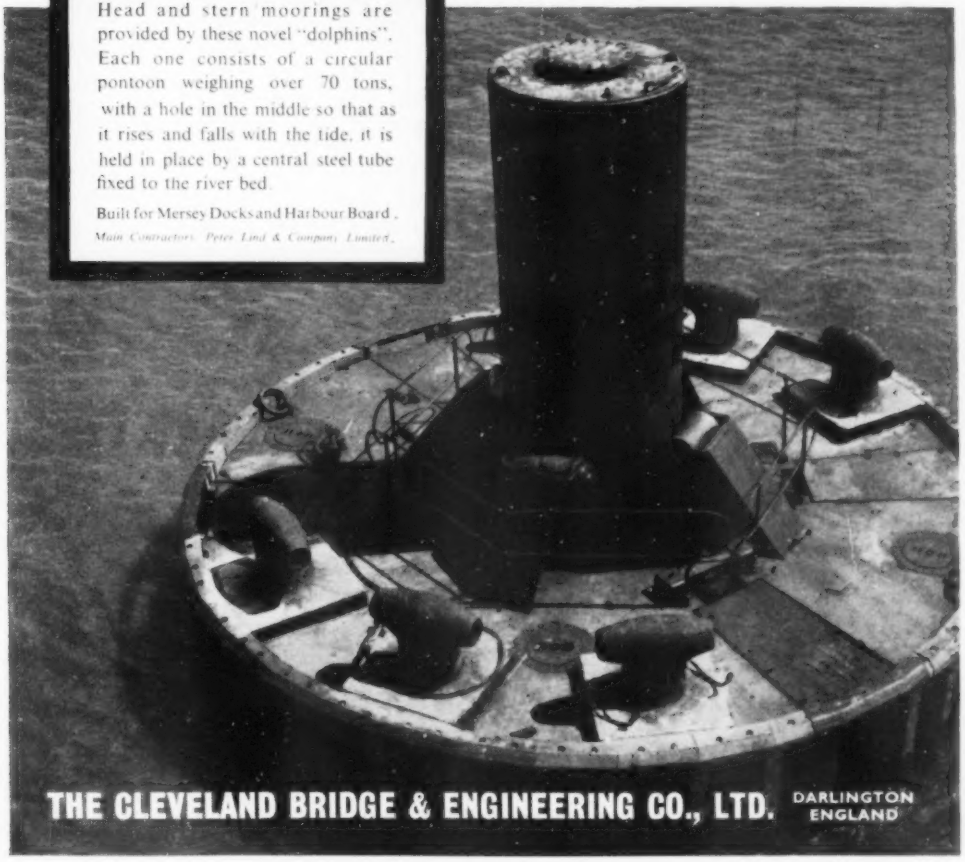
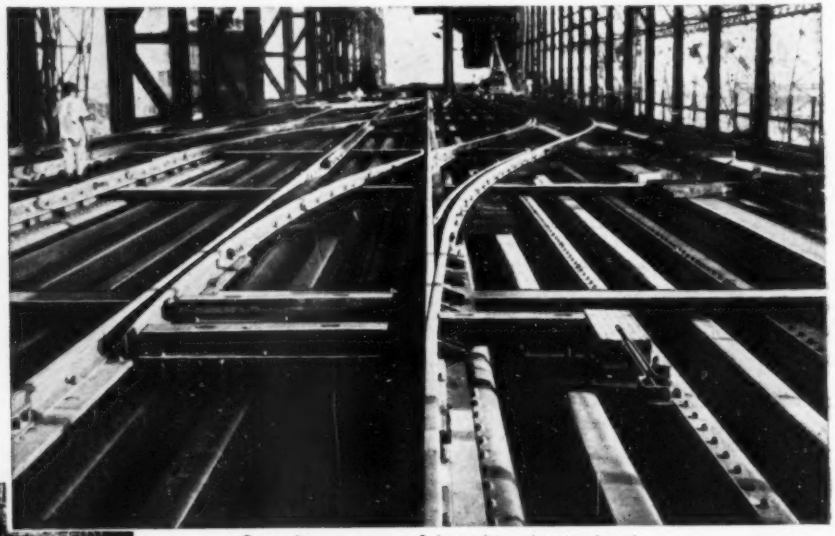
TRANMERE, LIVERPOOL

Head and stern moorings are provided by these novel "dolphins". Each one consists of a circular pontoon weighing over 70 tons, with a hole in the middle so that as it rises and falls with the tide, it is held in place by a central steel tube fixed to the river bed.

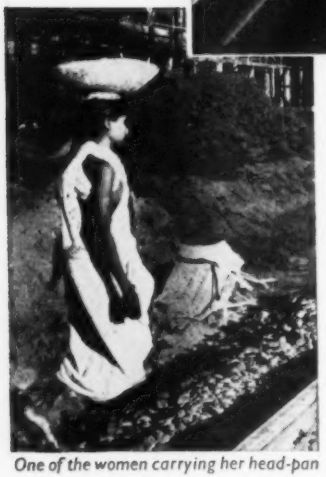
Built for Mersey Docks and Harbour Board.
Main Contractors: Peter Lind & Company Limited.



THE CLEVELAND BRIDGE & ENGINEERING CO., LTD. DARLINGTON ENGLAND



General arrangement of the melting shop trackwork



One of the women carrying her head-pan

Two ways to transport . . .

. . . and both in use at Durgapur. Hundreds of women working in a continuous line, each with her head-pan of materials, are employed in placing concrete. In the melting shop, however, the most modern practice specifies stage trackwork by Edgar Allen.

This comprises the rails, the turnouts built up of rail, the diamonds and charger crossings cast in Imperial Manganese steel, and cast steel double rails to resist the heat in front of the open-hearth furnaces.

BS90R rail with 5ft. 6in. gauge is standard, except for the charger track where 178·5 lb./yd. gantry rail at 28ft. gauge is used.

This Edgar Allen contract for melting-shop trackwork follows similar contracts at the steelworks of John Summers & Sons Ltd., Hawarden Bridge and Colvilles Ltd., Glasgow.

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Please post data on 'TRACKWORK' to:

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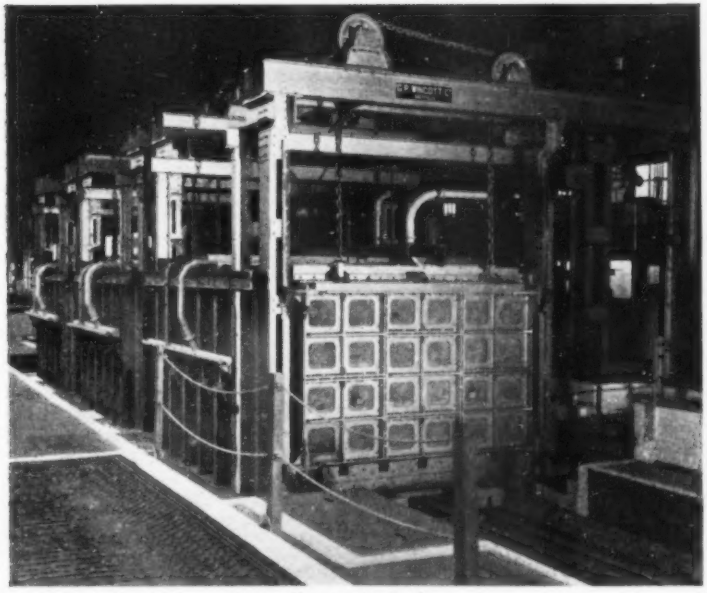
Cut fuel and labour costs in your **Steel Foundry** and achieve continuity of production by installing a **Triple Chamber Quenching Furnace**



By permission of Messrs. Edgar Allen & Co. Ltd.

The three separate chambers of this City Gas Fired Furnace are 12′ 0″ long × 10′ 0″ in effective width. They are each equipped with two electrically operated self-locking doors and operate as independent units.

The castings are preheated from cold to 300°C. in the first chamber and then pass to the second chamber where they are raised to 750°C. They are finally heated to 1100°C. in the third chamber and after soaking are quickly withdrawn by an extractor gear and conveyed to the oil or water tanks for quenching. The chambers are equipped with instruments for the automatic control of temperature, air/gas ratio and pressure. Prescribed heating curves can easily be maintained.

By utilising the third chamber as a cooling chamber the furnace can be employed for annealing purposes. When desired the first and third chambers can be independently used for the batch treatment of castings.

WINCOTT FURNACES

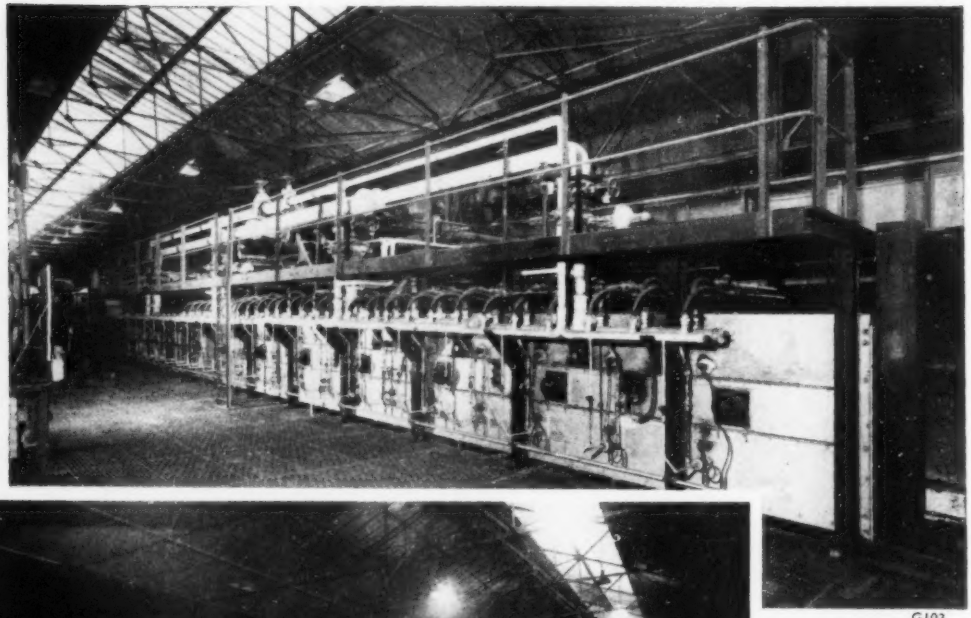
G.P. WINCOTT LIMITED SHEFFIELD, ENGLAND

Telegrams: WINCOTT, SHEFFIELD. Telephone: 20211/2

GIBBONS

GAS FIRED 'ALCORLIN LINE' FURNACE

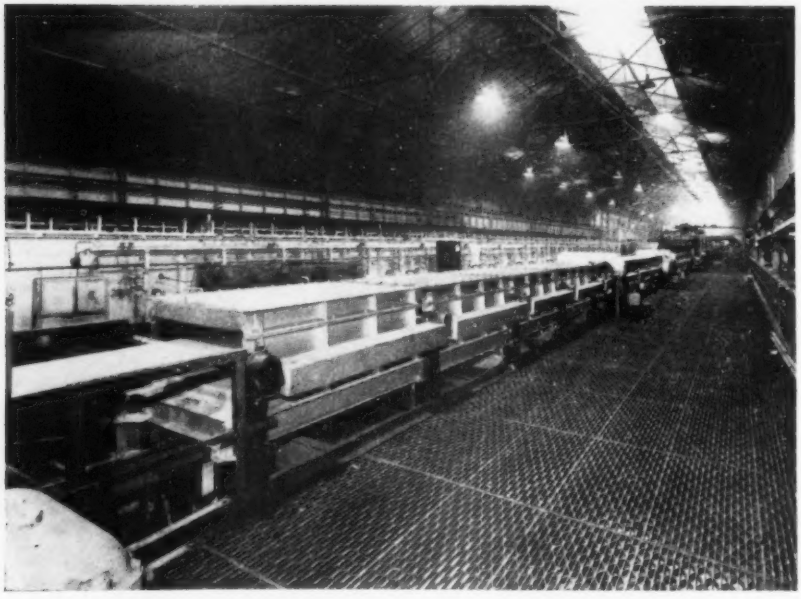
for the continuous drying and cooling of Alcorlin coated silicon steel strip



G103

GB

View of —
Water Cooling Section



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Messrs. Richard Thomas & Baldwins Ltd.,
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All enquiries to:— GIBBONS BROTHERS LTD., Dibdale, Dudley, Worcs. Telephone: Dudley 55141 (P.B.X.)

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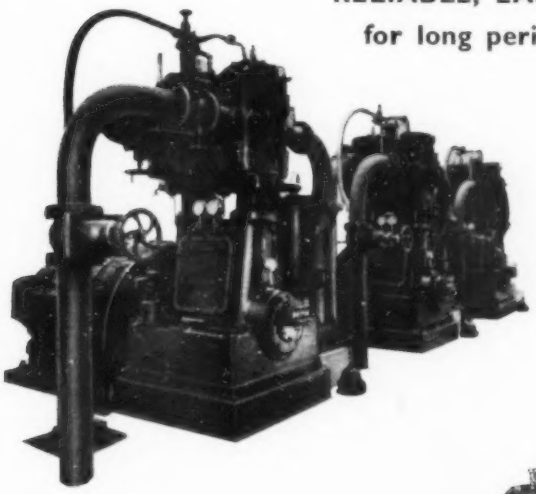
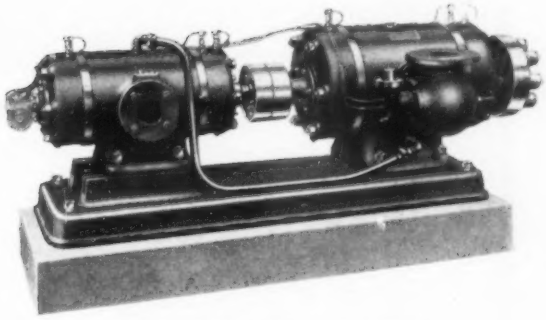
COMPRESSORS

RELIABLE, EASILY MAINTAINED, will operate for long periods at sustained high efficiency.



RECIPROCATING COMPRESSORS
500 to 6,000 c.f.m. to 120 p.s.i.g.

HIGH PRESSURE COMPRESSORS
Up to 50,000 p.s.i.g.



ROTARY COMPRESSORS
100 to 1,000 c.f.m. to 110 p.s.i.g.

Belliss & Morcom Ltd. are prepared to design and build Compressors and Vacuum Pumps for special purposes, and are always interested in receiving enquiries for the manufacture of machinery to YOUR OWN DESIGNS.

THESE MACHINES ARE EQUALLY SUITABLE AS VACUUM PUMPS OR AS GAS BOOSTERS.

HAVE IT 'BELLISS' BUILT

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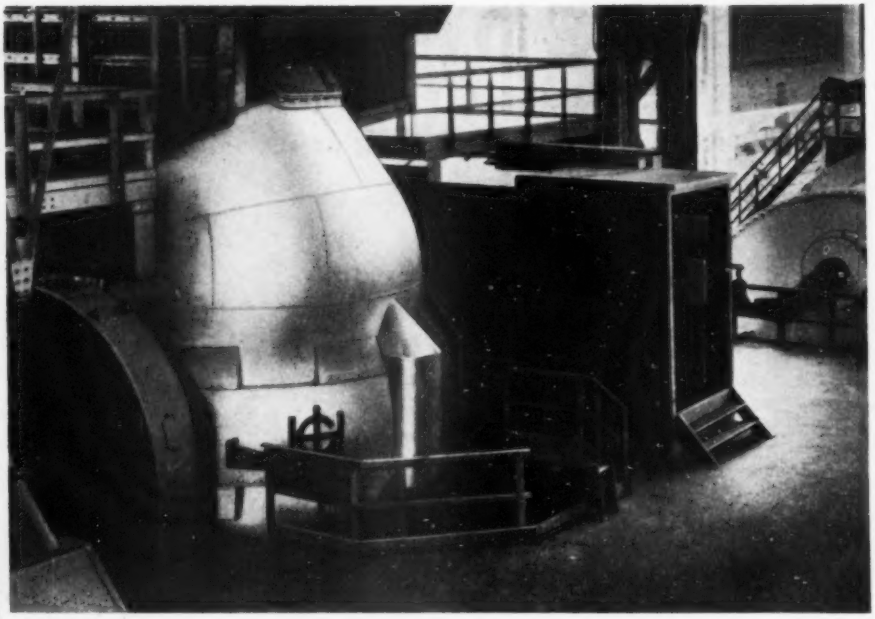
London Office: 25 Victoria Street, S.W.1

STEAM TURBINES · COMPRESSORS · VACUUM PUMPS
DIESEL ENGINES · DUAL FUEL ENGINES · STEAM ENGINES
CONDENSING PLANTS · "ARCA" AUTOMATIC REGULATORS



Completely welded 60 ton converter for oxygen-blowing steel works.

GHH carry out the design,
construction and delivery
of steelworks equipment,
for the new oxygen
steelmaking techniques,
in all parts of the world.

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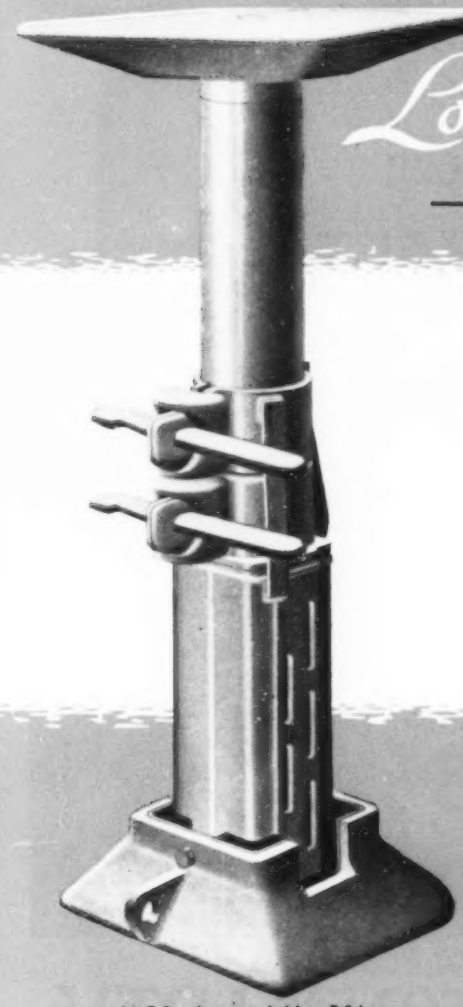
High performance and Low maintenance cost

— the special attributes of —



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THE HUWOOD T.C.R. CHOCK

(SHWARZ PATENT)

The design of the Huwood Chock has been streamlined in recent months to give greater ease of handling and improved performance. It is an ideal goaf side support in all face conditions and can be relied upon to function satisfactorily with the minimum of attention. It is a chock every colliery can afford—and few can afford to be without!

Can be supplied with canopies and bases to suit conditions.

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Head Office and Factories:
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Telegrams: Huwood, Gateshead. Telephone: Low Fell 76083 (5 lines).

Industrial and Export Office:
ROYAL LONDON HOUSE, FINSBURY SQUARE, LONDON, E.C.2.
Telegrams: Huwood Stock, London. Telephone: Monarch 3273 (4 lines).

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2

ELIMINATE WASTE
BY AUTOMATIC WASHING.

IN SOUTH WALES ALONE
THE FOLLOWING WASHER BOXES BY N-H AND VARIOUS MAKERS ARE NOW

THIS REPRESENTS MORE THAN 50% OF THE TOTAL TONNAGE OF COAL WASHED IN THE WHOLE OF SOUTH WALES

CONTROLLED BY
NORTON-HARTY AUTOMATIC GEAR

RESULTING in the SAVING of APPROX. 150,000 TONS of COAL PER ANNUM
WITHOUT the EMPLOYMENT of a SINGLE ADDITIONAL ATTENDANT

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BARGOED NORTH
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BEDWAS
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DUFFRYN RHONDDA
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GLENHAFOD
GLENRHONDDA
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LEWIS MERTHYR
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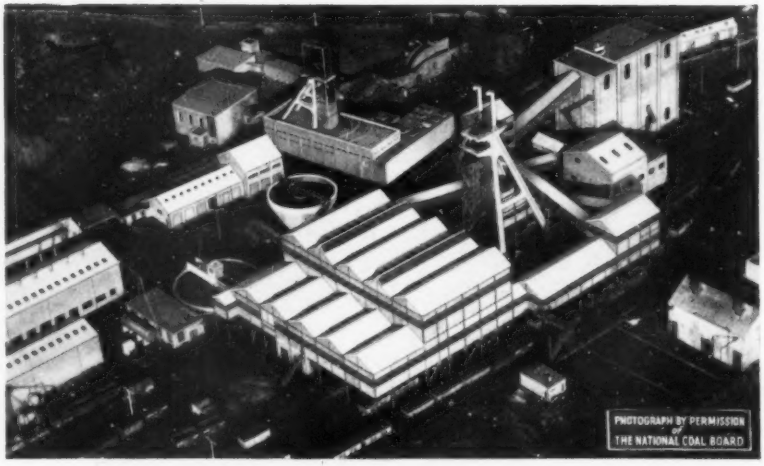
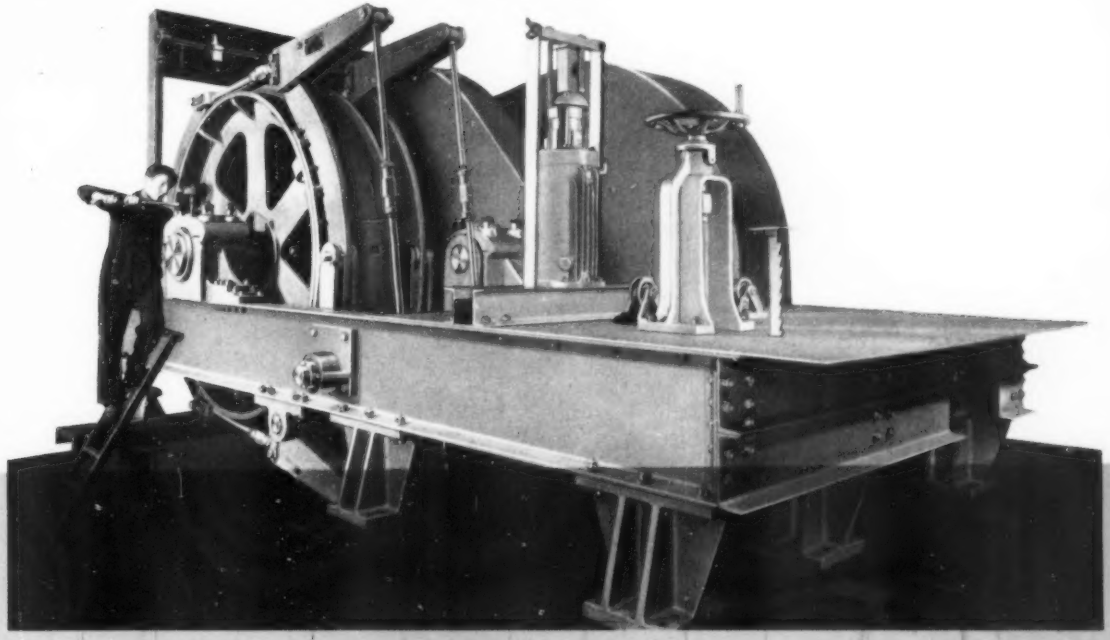
NANTEWLAETH
NAVAL
ONLLWYN
PENALTA
ROSE HEYWORTH
TARENI
TOWER
DAREN
ABERPERGWM
GELLI
CWMGWRACH
LLANBRADACH
MERTHYR VALE
DEEP DUFFRYN



THE NORTON-HARTY
ENGINEERING COMPANY LTD.,
TIPTON, Staffs.



250 h.p. Electrically Driven Endless Rope Manriding Haulage

Motor speed 488 R.P.M. Rope speed 6 M.P.H. 7′ – 0″ dia. surge pulley.

Frame 19′ – 0″ × 9′ – 6½″.

"Worrall" Overspeed Device and all electrical Limit Switches.

Thruster operated emergency incorporated in the main brake gear.

First motion Vee rope drive. Machine Cut Gear Wheels.

MAKERS OF ELECTRICALLY DRIVEN MAN RIDING OR MINERAL HAULAGE GEAR UP TO 300 H.P.
ELECTRIC WINDING ENGINES WITH ROPE SPEEDS UP TO 10 FT. PER SECOND.
HEADGEAR PULLEYS UP TO 20 FT. DIAMETER, WHOLE OR IN HALVES.
CENTRIFUGAL PUMPS, PIT CAGES, CAGE TUB LOADERS.
ANY KIND OF CASTINGS UP TO 6 TONS.
PROMPT ATTENTION TO BREAKDOWNS AND REPAIRS.
FACILITIES FOR MACHINING UP TO 22 FT. DIAMETER,
ALSO FOR MACHINING 18 IN. × 24 FT. BETWEEN CENTRES.

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BARNSLEY, YORKSHIRE
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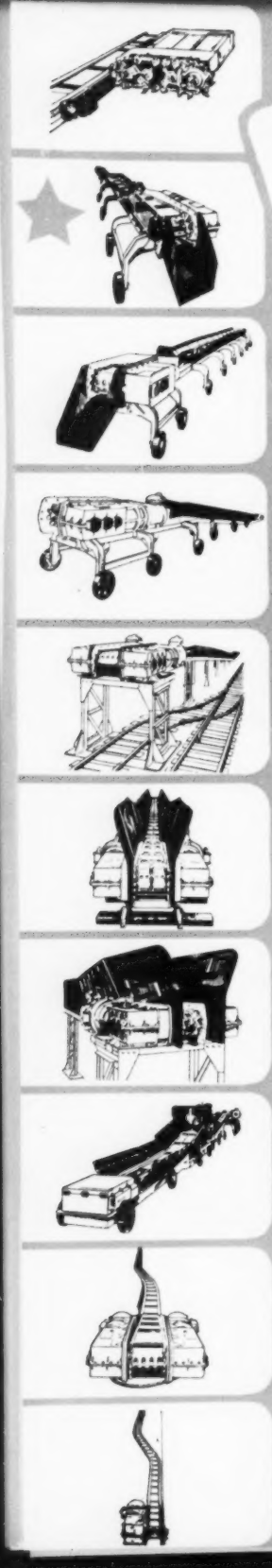

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for

POWER LOADING

- **WILCOX CONTINUOUS MINER**
- **CRAWLEY MIDGET MINER**
- **MOBILE STAGE LOADER**
- **MOBILE STAGE FEEDER**
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- **MOBILE BUNKER CONVEYOR**
- **STATIONARY BUNKER CONVEYOR**
- **MOBILE AND EXTENSIBLE STAGE COAL BREAKER UNITS**
- **HEAVY DUTY ARMOURED SNAKING CONVEYOR**
- **C5 LO-HITE ARMOURED SNAKING CONVEYOR**

Crawley products are of high capacity, rugged in design and low in maintenance cost. They have a high degree of standardisation and interchangeability of parts, and offer an efficient and sure solution to the conveying and power loading problems common to the longwall system of mining throughout the world.

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LLANELLY, CARMARTHENSHIRE. **Telephones and Telegrams: LLANELLY 4233**

A COMPANY OF THE AYLING INDUSTRIES GROUP

HEAVY DUTY

MOBILE STAGE LOADER

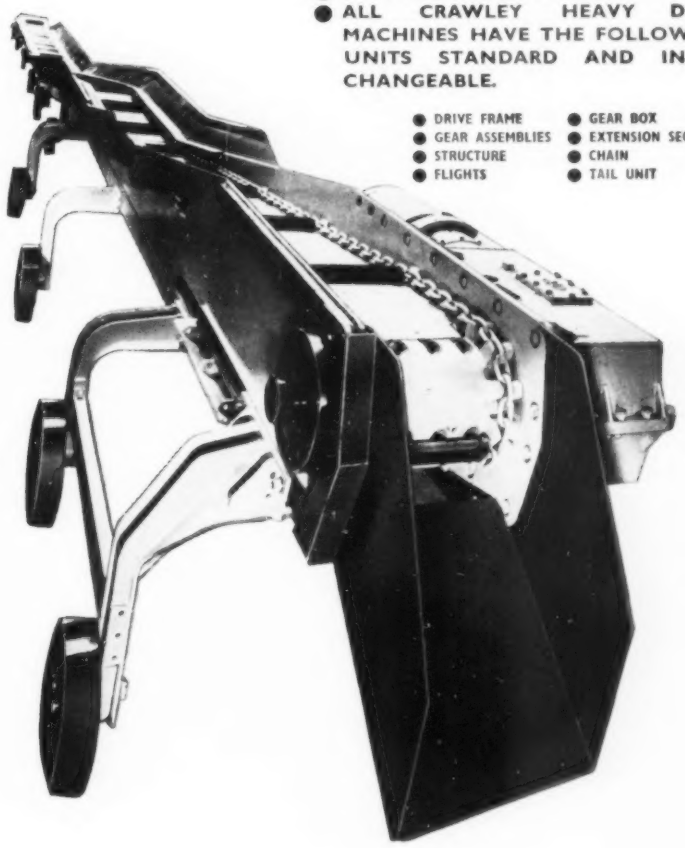
CAPACITY 250-350 TONS/HOUR

Standard length 19 yds. with 8 yds. coverage over 36in. belt. Supporting structure is available for all belt widths. Length and belt coverage may be increased if required.

The drive frame is machined as standard on both sides enabling either left or right hand fixing, with 20 or 50 h.p. gear box as required. Chain speed from 150 to 220 ft. per min. to suit individual conditions.

- HIGH CAPACITY
- RUGGED CONSTRUCTION
- LOW MAINTENANCE COST
- ALL CRAWLEY HEAVY DUTY MACHINES HAVE THE FOLLOWING UNITS STANDARD AND INTERCHANGEABLE.

- DRIVE FRAME
- GEAR ASSEMBLIES
- STRUCTURE
- FLIGHTS
- GEAR BOX
- EXTENSION SECTIONS
- CHAIN
- TAIL UNIT



ROSS

WAGON HANDLING SYSTEM

Up to 60 wagons per hour

Gravity Sidings to suit main line levels:

Draws the wagons one by one from gravity sidings

Elevates the wagons to the optimum plant height:

Feeds the plant steadily and automatically:

Returns the wagons to be coupled on gravity sidings:

Approved by British Railways:

MATERIAL HANDLING WITH

C4/W

Marshalling and Handling of the largest Tonnages carried out smoothly and continuously by ROSS Users:

Appleby-Frodingham Steel Company (Seraphim Plant)	1,250	T.P.H.
Appleby-Frodingham Steel Company (No. 1 Plant)	500	,,
Appleby-Frodingham Steel Company (No. 2 Plant)	500	,,
British Electricity Authority, Stalybridge	350	,,
Guest Keen Iron & Steel Co. Ltd., Cardiff	600	,,
National Coal Board, Bold Colliery	400	,,
Richard Thomas & Baldwins, Ltd., Scunthorpe	450	,,
Stewarts & Lloyds, Ltd., Corby	1,000	,,
South Durham Steel & Iron Co. Ltd.	700	,,
John Lysaghts Scunthorpe Works, Ltd.	700	,,
Bairds & Scottish Steel, Ltd.	1,000	,,
South Durham Steel & Iron Co. Ltd.	1,000	,,
Richard Thomas & Baldwins, Ltd., Scunthorpe (*under construction*)	800	,,

ROSS ENGINEERS LIMITED, 11 WALPOLE ROAD, SURBITON, SURREY

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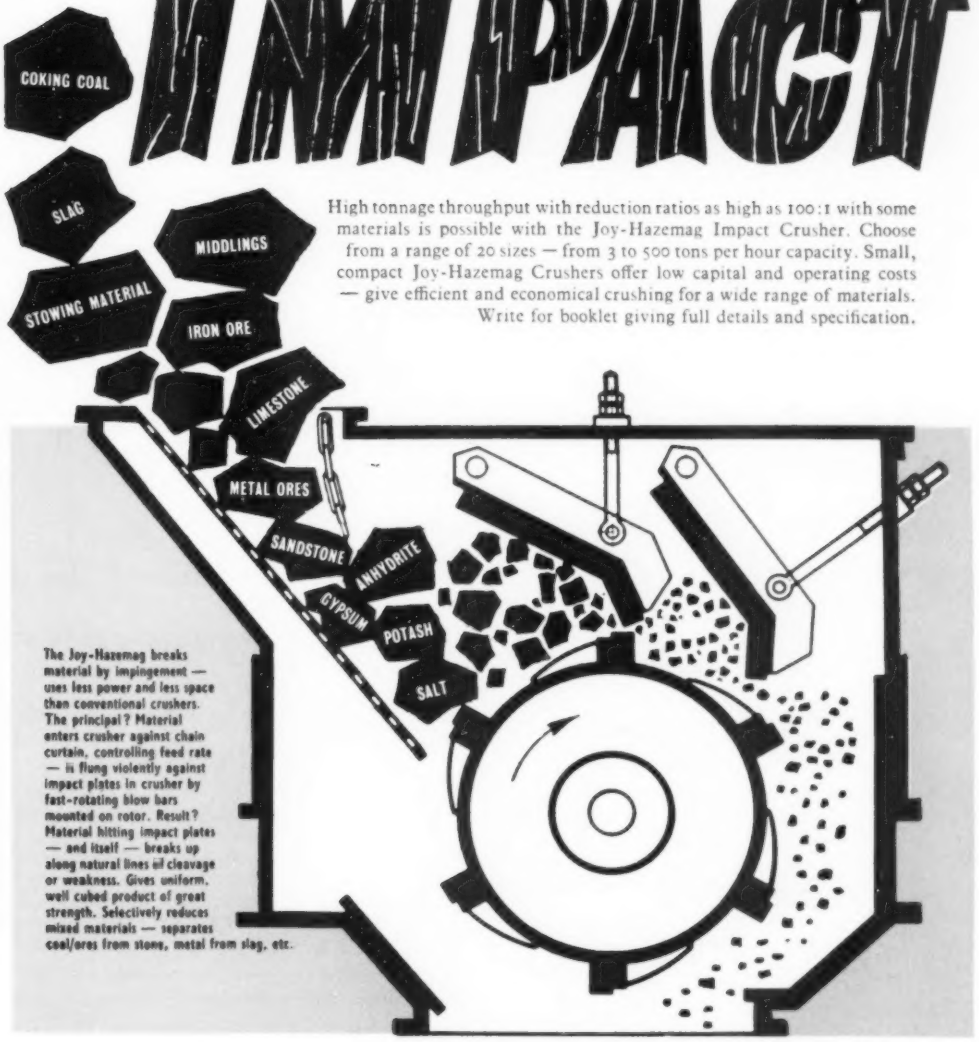
ROSS SCREEN & FEEDER CO., WESTFIELD, NEW JERSEY, U.S.A.

CANADIAN LICENCEES: DORR-OLIVER-LONG LTD., ORILLIA

LOW COST CRUSHING BY IMPACT

High tonnage throughput with reduction ratios as high as 100:1 with some materials is possible with the Joy-Hazemag Impact Crusher. Choose from a range of 20 sizes — from 3 to 500 tons per hour capacity. Small, compact Joy-Hazemag Crushers offer low capital and operating costs — give efficient and economical crushing for a wide range of materials. Write for booklet giving full details and specification.



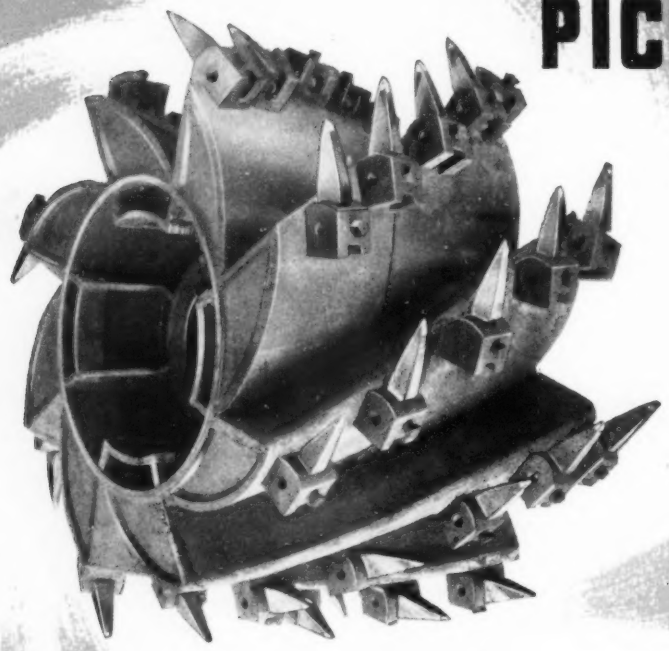
The Joy-Hazemag breaks material by impingement — uses less power and less space than conventional crushers. The principal? Material enters crusher against chain curtain, controlling feed rate — is flung violently against impact plates in crusher by fast-rotating blow bars mounted on rotor. Result? Material hitting impact plates — and itself — breaks up along natural lines of cleavage or weakness. Gives uniform, well cubed product of great strength. Selectively reduces mixed materials — separates coal/ores from stone, metal from slag, etc.

JOY-HAZEMAG Impact CRUSHERS

JOY-SULLIVAN LIMITED · CAPPIELOW · GREENOCK · SCOTLAND

HC1

The HEELEY SHEAR DRUM *with* HIGHER SPEED METALS PICKS



★ FASTER HAULAGE SPEEDS
★ A MINERS PICK, MECHANISED
★ AMPERAGE DOWN
★ LARGER COAL
★ LESS RECIRCULATION
★ THE ONLY DRUM WITH PICK POINT ATTACK
★ A HIGHER PERCENTAGE OF COAL DEPOSITED ON CONVEYOR

A Product of the

HEELEY (MINING MACHINERY) CO LTD.
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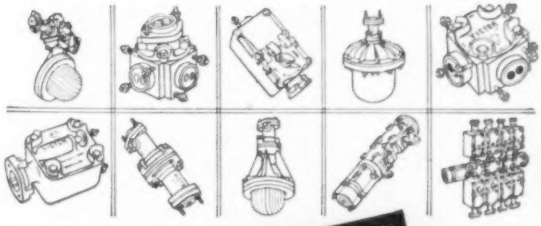
Adaptability

The VICTOR range of Certified Flameproof Lighting Fittings has been designed to meet the needs of the modern mining engineer.

Flexibility of design permits development from a single light to a district feeder point comprising switches, fuses, distribution boxes etc. The basis is a number of unit fittings and equally simple accessories capable of being plugged one into the other to build up any combination of lighting needs.

Thus lighting arrangements can be speedily extended or modified—or dismantled with equal facility.



Please write for Booklet L500 for complete details.

VICTOR PRODUCTS (WALLSEND) LTD.
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Victor

FF 3

LINDLEY

FULL BORE HIGH PRESSURE MINOR VALVE

For use where Full Bore is a necessity, in conjunction with LINDLEY "Full-Bore" Nipples, Hose Couplings, etc.

In response to requests for increased water supply on infusion, impulse firing, etc., we are pleased, after exhaustive tests, to offer with full confidence our specially designed Full Bore equipment.

Same robust construction, with Stainless Steel internal components, as Lindley Standard Minor Valve.

Working Pressure up to 5,000 lbs. p.s.i.

Sizes :— $\frac{3}{8}$", $\frac{1}{2}$", $\frac{3}{4}$", 1".

L 150

MARK 11 MINOR VALVE

Pre-adjustable restrictor valve to provide variable small quantities of water from high pressure range. Fitted with safety valve for hose protection.

Also adaptable for:—

WATER STEMMING BAG FILLER

Specially designed for filling Water Stemming Bags underground with attachment for quick and easy filling.

ANOTHER LINDLEY PIT JOB

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DEANSTONES WORKS - DEANSTONES LANE
QUEENSBURY - Nr. BRADFORD
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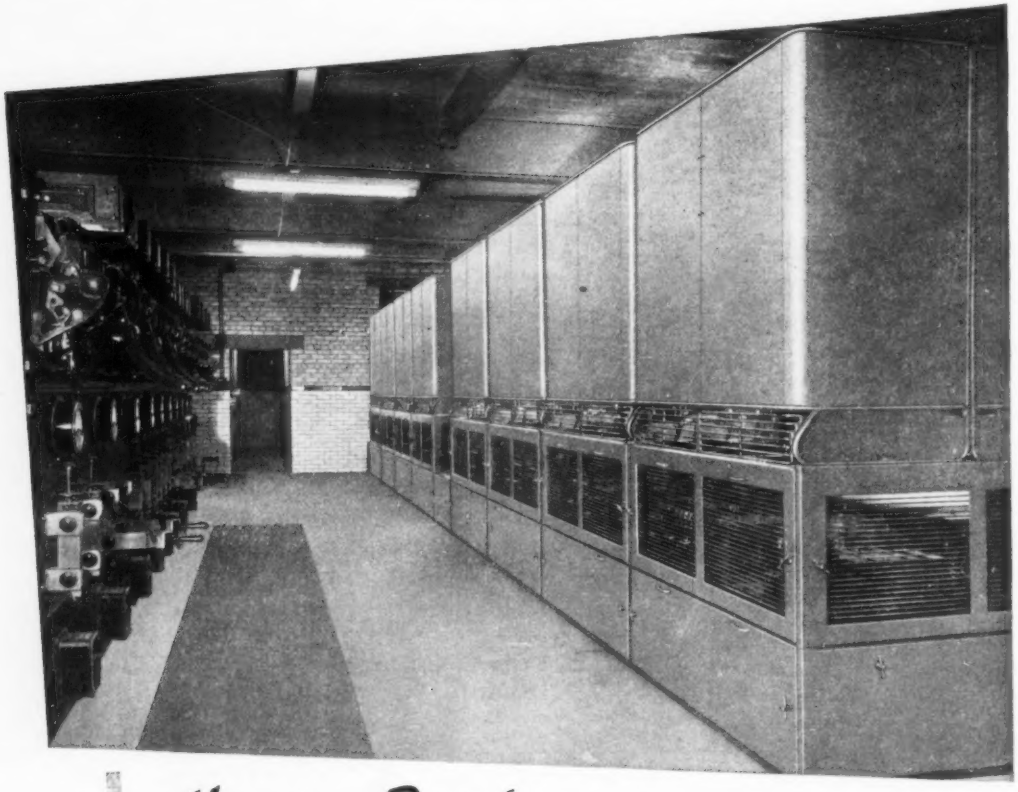
BTR CONVEYOR BELTING

Steel production, from quarry face to finished stock, calls for the best of equipment . . . for conveyors this means BTR-engineered belts. That's why Richard Thomas & Baldwin Ltd installed BTR belting at Ystrad, near Ebbw Vale—to meet and beat the challenge of heavy, belt-punishing limestone.
For your conveyors, whatever the load, there is a BTR belt that's right for the job!

1/3205



Hewittic Rectifiers FOR STEELWORKS

The illustration shows two 900 kW Hewittic Rectifiers providing an output of 3600 amps for operating rolling mill auxiliaries in a Scottish steelworks.
There are over 1,500,000 kW of Hewittic Rectifiers in world wide service in capacities up to 30,000 kW.

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TRANSFORMERS—including mining type.

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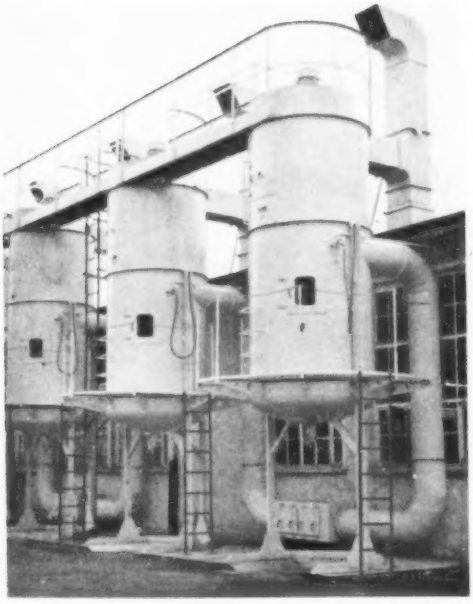
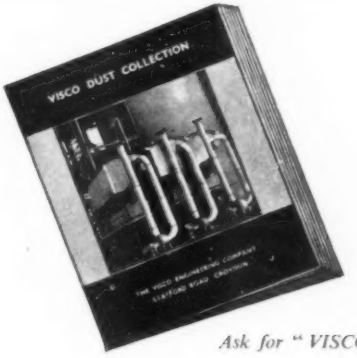
R31

HOW TO CONTROL YOUR DUST...



If you have a dust recovery or powder handling problem of any kind, you will find our latest brochure useful and interesting. In it we discuss dust collection in general and give numerous examples of the application of dust recovery equipment to various industries. The information in the brochure is based on many years' experience in dealing with practically every kind of material in powder or fibrous form. It also contains illustrations showing different types of equipment varying from large centralized plant to small units for use with individual grinding or polishing machines. Enquiries invited to THE VISCO ENGINEERING CO. LTD., Stafford Road, CROYDON. Croydon 4181.

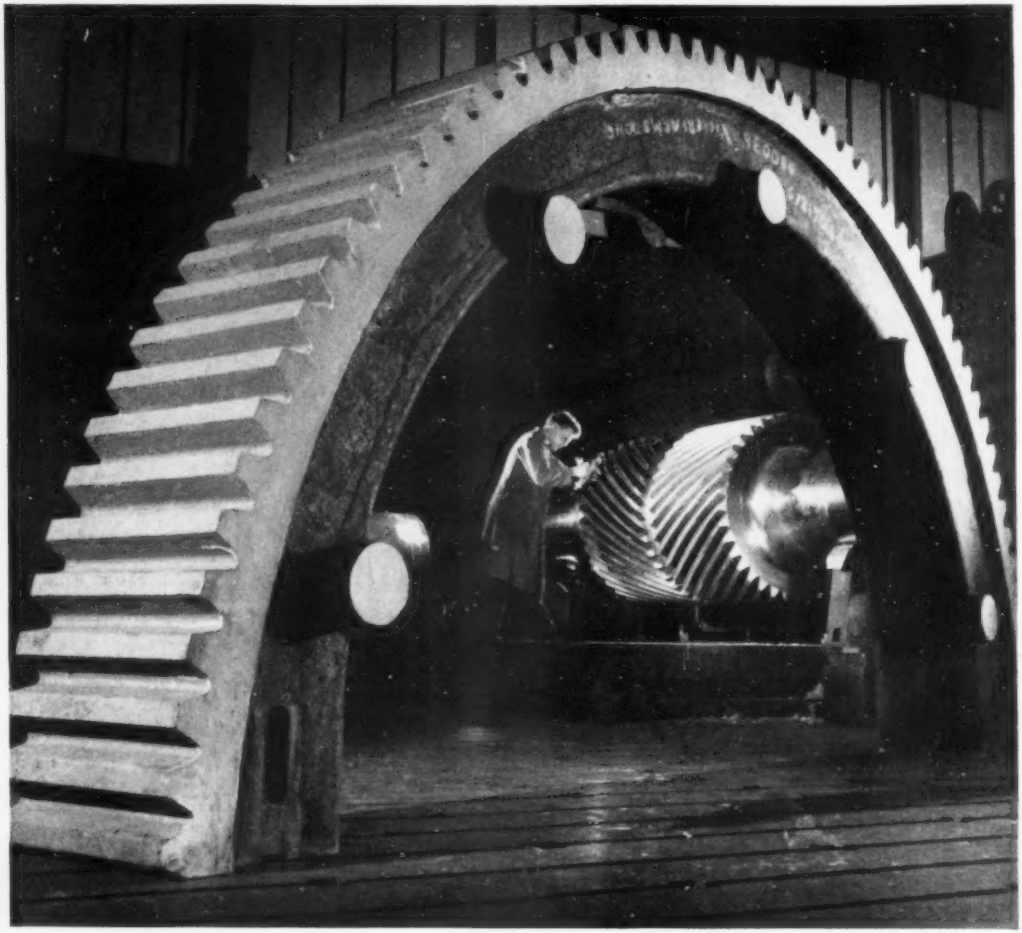


VISCO

Modern Dust Collectors

FWS

Ask for "VISCO Dust Collection", free on request.



Halfway to perfection

This half of a Girth Gear is destined for a cement mill. Although the gear is still 'as cast' the admirable characteristics of the D.B. breed are already evident; and in its regular rugged form there's the promise of long reliable life. It's a big gear—but by no means one of David Brown's biggest. D.B. gears are accurately hobbed up to 32 feet diameter—and nobody in the U.K. makes them bigger than that! Getting the message? Simply, it's—whatever your industry you can't beat David Brown for gears.

DAVID BROWN

100 YEARS SERVING INDUSTRY 1860 1960

THE DAVID BROWN CORPORATION (SALES) LIMITED

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OA/6186

Another

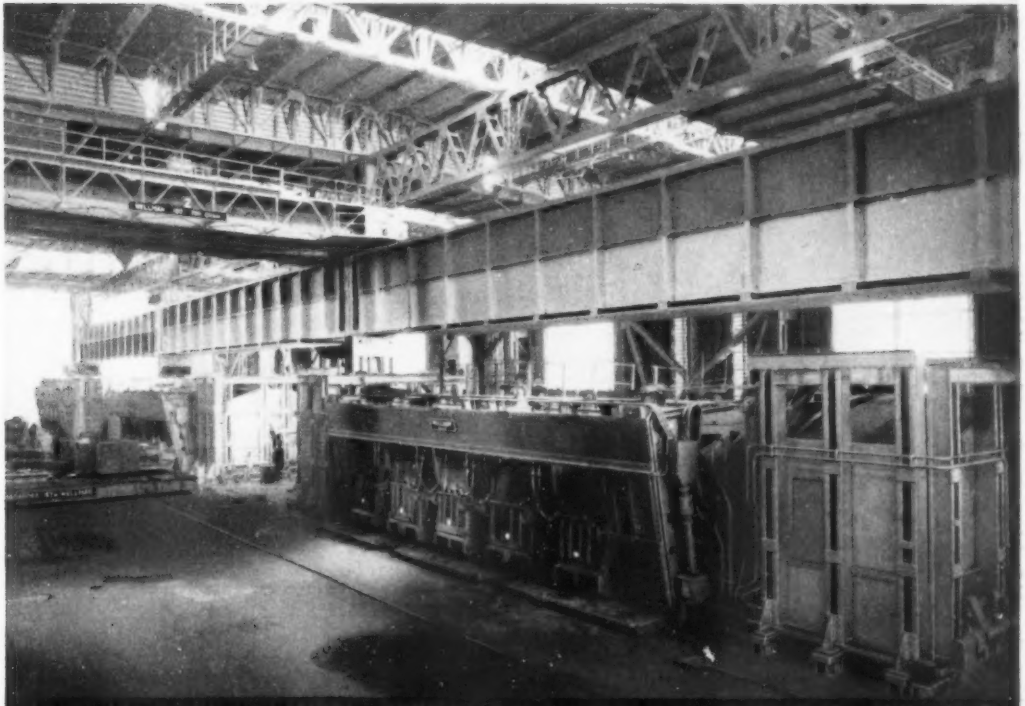
Wellman

Complete Steelworks Installation

Below is illustrated a complete Open Hearth Steel-Melting Shop designed and constructed by Wellman for Empresa Nacional Siderurgica S.A., Aviles, Spain.

This modern steelworks which marks an important step in the expansion of the Spanish Steel Industry includes: three 350-ton Open Hearth Tilting Furnaces, one 600-ton Active-type Metal Mixer, two 100-ton Hot Metal Cranes, two 4-ton Ground-type Revolving Open Hearth Furnace Chargers, two 140-ton Ladle Cranes, etc., etc.

Further orders have been received from these clients for Wellman Soaking Pits, Reheating Furnaces, Charging Machines, etc.



THE WELLMAN SMITH OWEN ENGINEERING CORPORATION LTD

PARNELL HOUSE, WILTON ROAD, LONDON, S.W.1 WORKS: DARLASTON, South Staffs, & BELFAST.

BURTONWOOD

BURFLEX SEALS *are ensuring complete protection to Flood-Oil, Morgoil, S.K.F., Timken, etc. Roll Neck Bearings throughout the world. (Up to 4' 0" Roll Neck Diameter)*

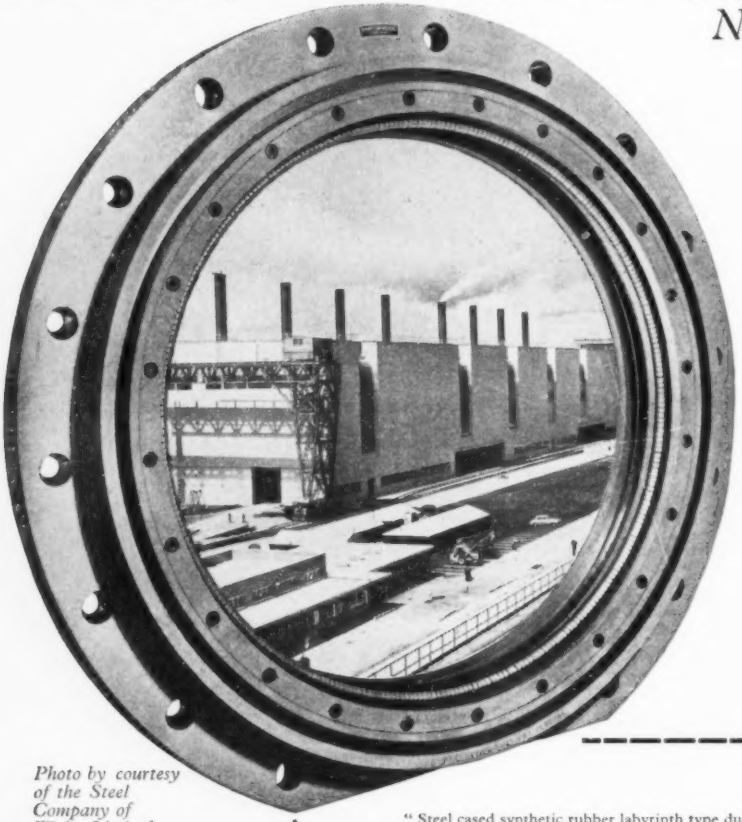


Photo by courtesy of the Steel Company of Wales Limited

The Seal illustrated is a typical Heavy Duty Seal as supplied to leading Rolling Mill Manufacturers and Users in many parts of the world. A Lighter Type is also available as a replacement for all standard makes and is completely interchangeable.

Burtonwood Seals are also manufactured for Coilers, Slitters, Leveller Rolls and every Engineering application. *Write for particulars, Ref. US/IC, and one of our Engineers will gladly call and advise.*

"Steel cased synthetic rubber labyrinth type dust seals—approved N.C.B. design."
These seals are arranged to be interchangeable with mild steel labyrinth seals shown in N.C.B. standards P.147/1957 and P.152/1957. They are available for all mine car payloads and are supplied to leading manufacturers of mine cars, wheels and axles. Write for specifications and prices.

BURTONWOOD ENGINEERING CO LTD

BURTONWOOD · WARRINGTON · LANCS. Tel: Newton-Le-Willows 2641 (10 lines)

BRITISH STEEL AT ITS BEST

CARBONS UP TO 1.0%
DEEP STAMPING
AND RIMMING, FREE CUTTING,
LEAD BEARING.

LYSAGHT'S SCUNTHORPE WORKS
Branch of G.K.N. Steel Company Limited,
NORMANBY PARK STEEL WORKS,
SCUNTHORPE, LINCOLNSHIRE.
Telephone: SCUNTHORPE 2271 (7 lines.)

A MEMBER OF THE GKN GROUP OF COMPANIES

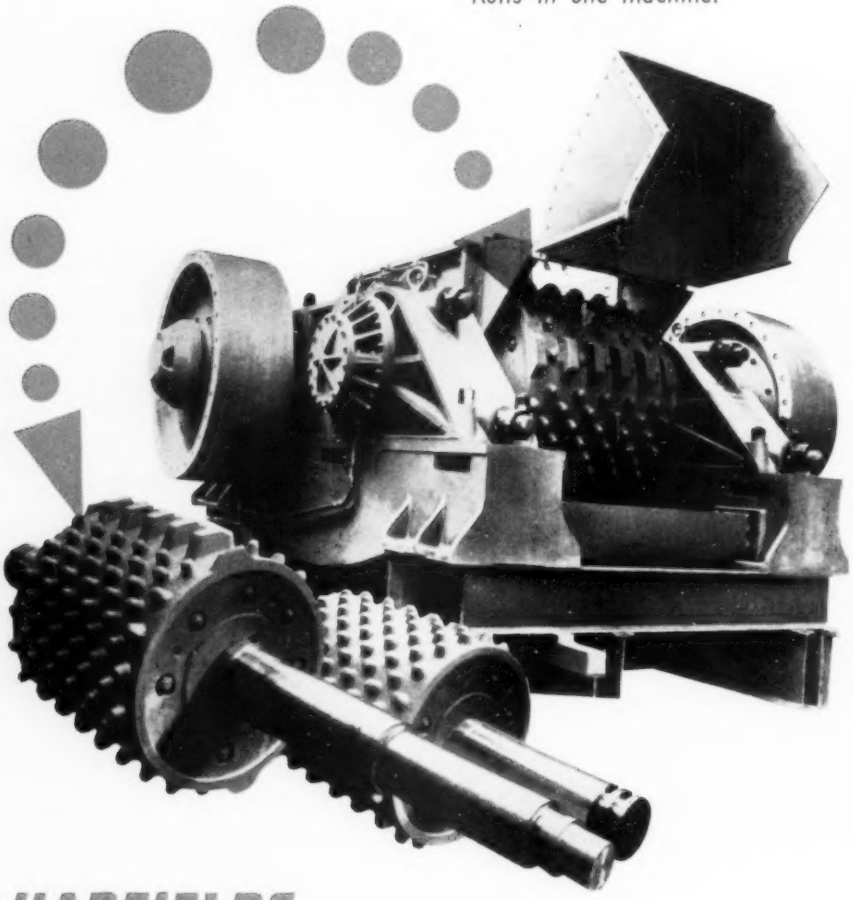
LYSAGHT'S SCUNTHORPE

4

UP TO 900 TONS PER HOUR . . . . . CRUSHING ROLLS . . .

For Ironstone in a range of sizes from 3ft x 3ft to 6ft x 3ft.

The Hadfields range of massive 'E' type Crushing Rolls combine all the advantages of Hammer Mills and Rolls in one machine.



HADFIELDS
SHEFFIELD

HADFIELDS LTD., EAST HECLA WORKS, SHEFFIELD, ENGLAND

With the Hanmade Anti-breakage Storage Bunker haulage breakdowns, derailment or shaft hold-ups need not stop production. Normally coal can proceed 'straight through" but in the case of bottle necks out-bye of the bunker, production can be turned into the Bunker and unloaded later in the shift. Advantages?
Greater flexibility of output, less coal degradation and increased production.

Requires only one man to operate.

Developed in conjunction with the Mechanization Dept. of Area 1 East Midlands Division of the National Coal Board.

hanmade anti-breakage storage bunker

HANMADE CONVEYOR CO. LTD., WINIFRED STREET, HUCKNALL NOTTS. Telephone 3448/9

Complete MINE CAR HANDLING PLANT

AT FRICKLEY COLLIERY

Apply Hydraulics-Increase

Control Points

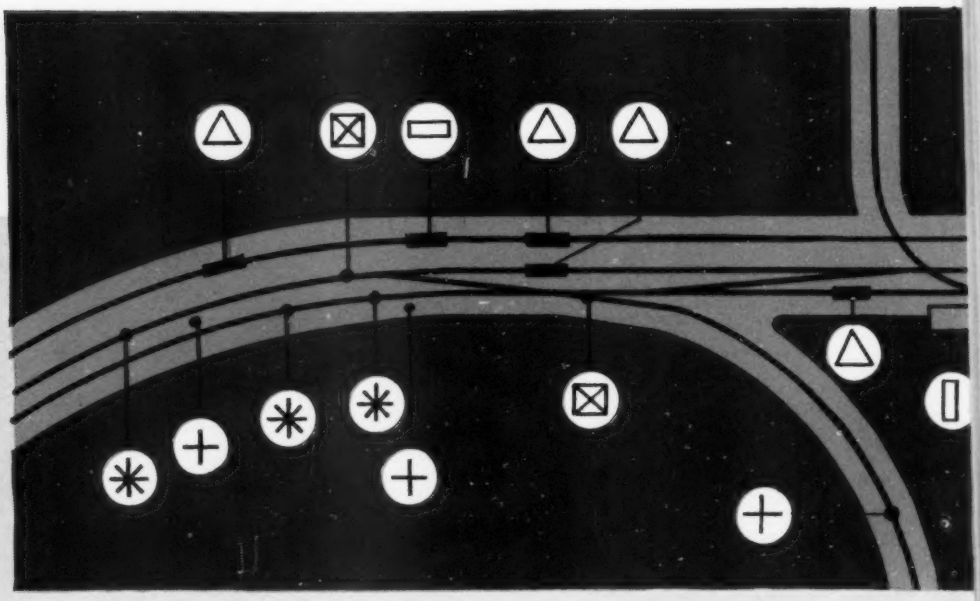
Tub Stops

Retarders

Tub Puller

Power Pack

Rail Point Cylinders



This diagrammatic arrangement of the mine car handling system at Frickley Colliery is a typical Sutcliffe installation designed and engineered to provide a safe and simple system of control. When considering a new scheme, a reconstruction or re-organisation or just a single unit, do not overlook the tremendous advantages of hydraulic equipment. Savings in manpower of up to 80% have been recorded; the system is self-lubricating and conversion of compressed air systems results in a substantial saving in horsepower.

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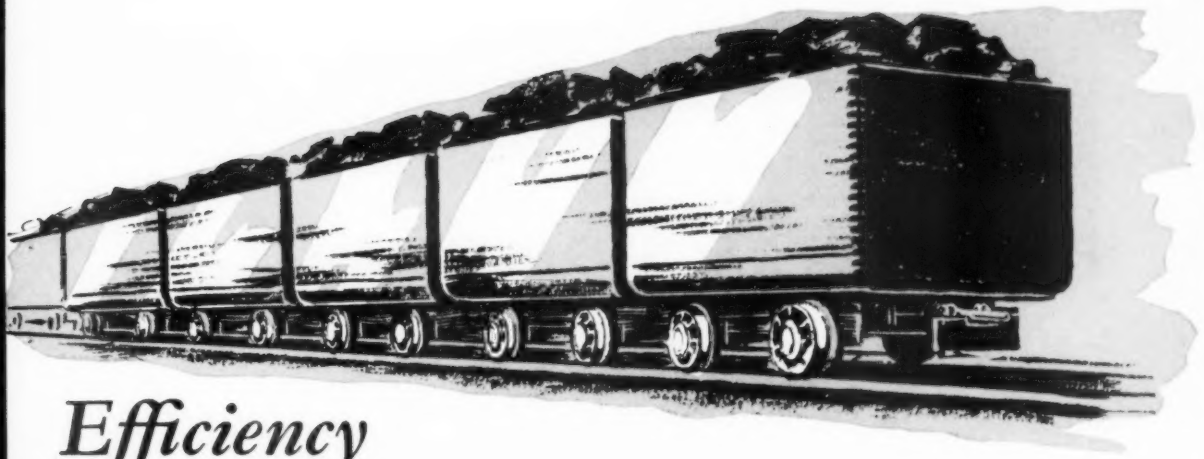

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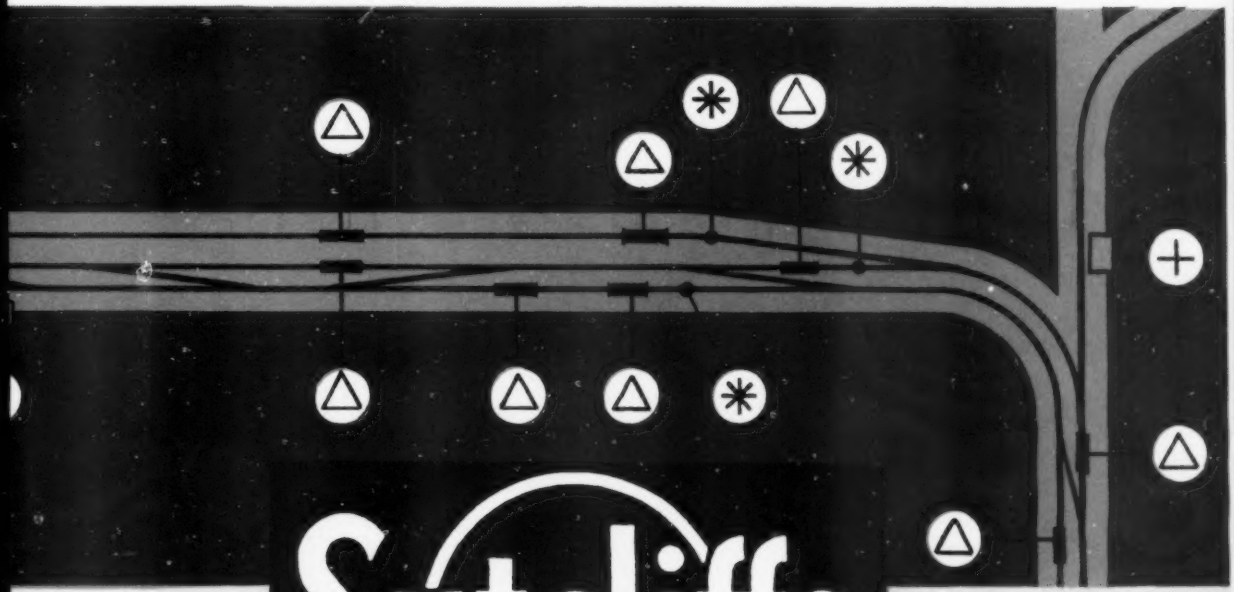

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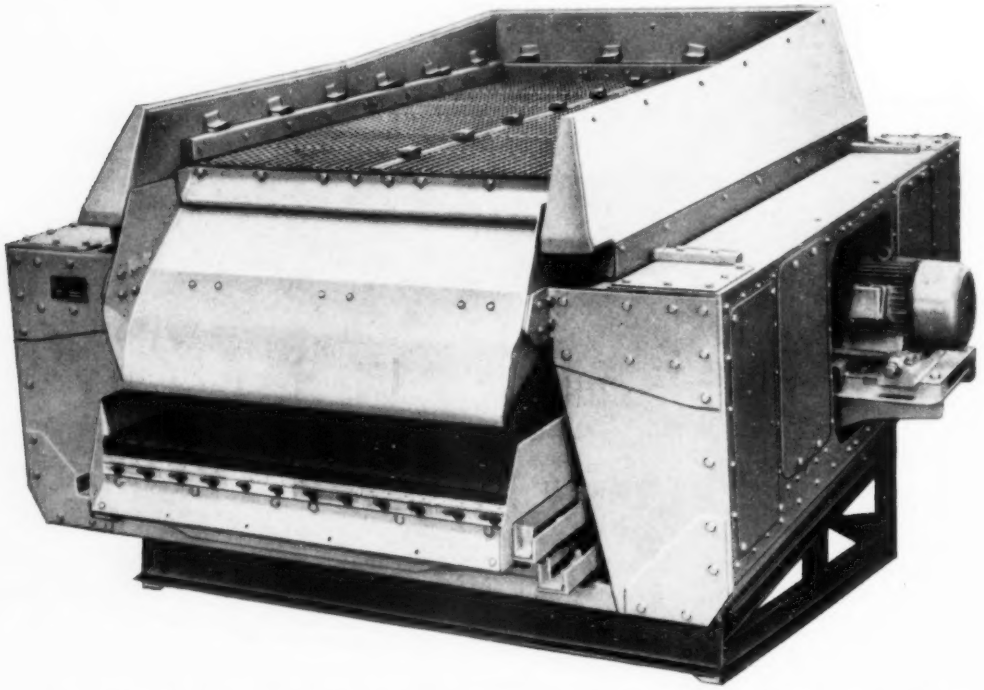

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No. 4830

IRON & COAL

THE IRON AND COAL TRADES' REVIEW

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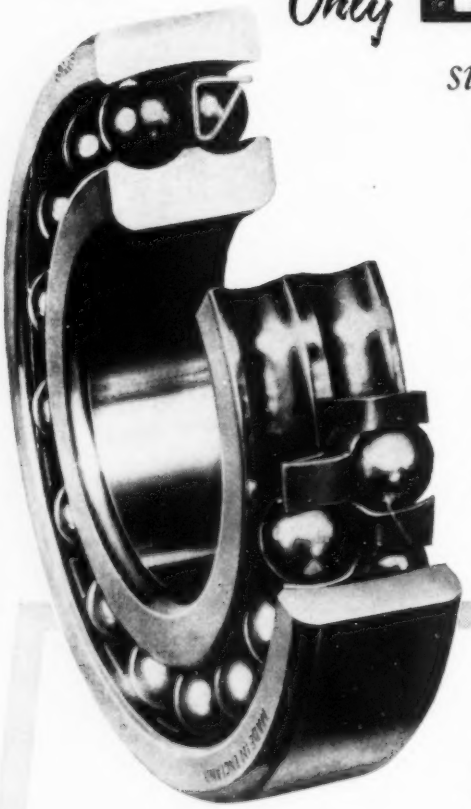

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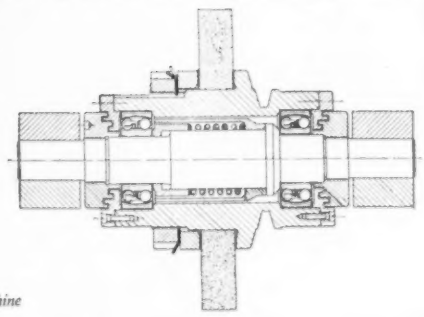

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IRON & COAL
THE IRON AND COAL TRADES REVIEW

Vol. 182 February 10, 1961 No. 4,830

Six Bells

ALL who are concerned in the management of collieries or are interested in safety in mines will study with great interest the very readable, comprehensive, and eminently helpful report by Mr. T. A. Rogers, HM Chief Inspector of Mines, who was the commissioner appointed to preside over the public inquiry and to report upon the causes and circumstances attending the explosion which occurred at Six Bells Colliery (Mon), on June 28, 1960. A commendable feature about this report—as, indeed, about many of the recent reports on serious incidents at collieries—has been the expedition with which the report has been published following the completion of the proceedings at the public inquiry.

Although there was not complete unanimity on the matter at the inquiry, there will, we think, be very few people who will disagree with the commissioner's finding that the disaster started with an ignition of firedamp near the face of the intake airway and loading gate of the O.10's conveyor face in the W District of the Old Coal Seam and that this ignition raised coal dust which was ignited and was the main agent in causing the explosion to spread throughout practically the whole of the district, killing 45 of the 48 men who were at work in the district at the time. The evidence in general suggests that, mercifully, the victims lost consciousness rapidly due to the presence of lethal concentrations of carbon monoxide and that in all cases death occurred within a very few minutes. The three survivors, who were employed in a part of the district reached by the outer fringes of the explosion, fortunately escaped with only minor bruises. They were, however, too far away from the point of origin of the explosion to be able to contribute information that would have helped in clearing up some of the uncertainties as to where and how the explosion began.

There will also, we think, be general agreement with the view that the most probable source of ignition of the firedamp was an incendive spark caused by the impact of a quartzitic stone which fell from the roof of the roadway near the lip of the face ripping and struck a steel canopy which was used for the protection of the roadway conveyor during blasting operations. It is disappointing, however, that the evidence bearing on the source of ignition was not such as to be fully conclusive. Even if, however, the evidence was not truly satisfying either as to the exact place where the ignition first started or as to the precise mechanism and source of ignition, enough was revealed by the extremely thorough and painstaking investigations that were made by a host of experts to direct the attention of mining men to a number of factors which, in all probability, singly or collectively contributed to the disaster—or, if they did not do so, at least might have done so in appropriate circumstances.

Experience shows that a disaster—and especially an explosion of gas and coal dust—seldom arises from a single cause; rather does it occur from a combination of factors, each one perhaps not very important in itself, but highly dangerous when it occurs in conjunction with other adverse factors. Experience also indicates that the conjunction of these factors in time and place seldom arises from the acts or omissions of a single individual, but rather from the acts or omissions of quite a number of people. This explosion was no exception to general experience.

It is not surprising therefore that the report deals at considerable length—and in a very helpful and constructive way—with a number of factors which, considered individually, could hardly be expected to bring about a disaster, but which in combination almost certainly brought about the circumstances which led to the start and subsequent spread of this particular explosion. Nor perhaps is it surprising to find that some of the factors which contributed to this explosion also played a part in some of the explosions that have occurred in the mines of this country during the past 10 or 12 years; roof cavities containing accumulations of gas, gas layering, incendive sparking due to falls of rock upon metal, coal dust on or below conveyor belts and structures, faulty shotfiring practice, contraband, and so forth.

Mr. Rogers makes several recommendations aimed at reducing the risk of explosions in mines. He calls for greater urgency and intensification of effort in the consideration of the precautionary measures necessary to minimize the danger from coal dust on conveyor roadways near the working face; for a recognition by colliery management of the potential danger of incendive sparking by falling rock as an added reason for ensuring high standards of ventilation in roof rippings, cavities, and waste edges; for more specialist help from the National Coal Board to colliery managers on ventilation matters including methane drainage; for more encouragement to trials of foam injection into ripping shotholes; for fresh consideration by

mining engineers and managers of ways and means of reducing the incidence of large cavities and of dealing safely with any which occur; and for a joint review by the Minister of Power and other interested parties of the use below ground of air ejectors. These suggestions, many of which are already under active consideration, will be acceptable to, and no doubt welcomed by, colliery managers, who will, we feel sure, do all in their power to see that they are carried out.

As the Chief Inspector said, a disturbing feature of this explosion was that it occurred in a district which was considered to be "a good average district." Having regard to the number and variety of factors that contributed to the onset and spread of this explosion, the disaster emphasizes once again that safety in mines is not a one-man affair, but is a job for all concerned, management and men alike.

Steel Production Rise in January

PRODUCTION of crude steel during January rose to an average of 478,400 tons a week from the December rate of 451,100 tons, states the Iron and Steel Board. The average rate in January was reduced to the extent of about 15,000 tons a week by the New Year holiday, and if allowance is made for this loss production in January approaches the average of 501,200 tons a week reached during October and November.

The recently announced reductions in the number of shifts worked at some of the continuous mills producing sheet and tinplate had little effect during January on the production of crude steel. Some of the steel output associated with the continuous sheet and tinplate mills has been used in recent weeks to increase the stocks of ingots and semi-finished steel. The rate of output at works producing other products also remained high.

Latest pig-iron and steel output figures (in tons) with the corresponding 1959 and 1960 returns are shown in the following table:—

Period.	Pig-iron.		Steel ingots and castings.	
	Weekly average.	Annual rate.	Weekly average.	Annual rate.
1960—November ..	315,000	16,382,000	504,500	26,234,000
December ..	306,000	15,912,000	451,100	23,459,000
1961—January ..	308,500	16,040,000	478,400	24,876,000
1959—November ..	277,300	14,422,000	458,600	23,847,000
December ..	280,400	14,583,000	432,900	22,513,000
1960—January ..	297,500	15,470,000	471,400	24,511,000

FOREIGN TRADE officials of East Germany are negotiating with UK companies for supplies of equipment for East Germany's iron and steel industry. Negotiations will continue during next month's Leipzig Spring Fair.

Passing Thoughts . . .

IN the long run, it is not possible for the coal industry to survive on its present scale, any more than it was for sail to compete with steam. How long it will be able to . . . defer the day when the industry withers away depends not on the nuclear power industry, but on the coal industry, on the determination of all who work in it to keep the price of coal down. Every time the price of coal goes up . . . there is an increased urge and an increased argument to accelerate the nuclear power programme.—VICE-ADMIRAL HUGHES HALLETT, MP, during a debate in the House of Commons.

Merchants complain that supplies from the Coal Board are insufficient. The Coal Board replies that merchants are receiving their full allocation, but are failing to stock up in the summer. Mr. Robens will earn the respect of householders if he solves this unfortunate annual wrangle.—NORMAN WOODHOUSE, *writing in the Western Mail.*

In the past the major purchasers [in the Far East] were Crown Agents or British industries. Today Chinese and Asians are buying many more capital goods than are bought by Europeans. You must have advertising and it must be of an American type—pressure advertising. Service is also important in exporting. I have been horrified to find that people in this country have accepted lack of service as part of the normal routine of life.—MR. FRANK M. STOTT, a Singapore marketing and industrial development consultant, speaking to the Sheffield Junior Chamber of Commerce.

I do not want to have too many Export Councils. The important thing about an export council is that we should get people of top quality on it and the number of such people may be limited.—MR. REGINALD MAUDLING, *President of the Board of Trade.*

Many firms are now so big and their business is so complicated that we need to look closely at the quality of our managers. Management today involves relations with Government and trade unions, and requires team work between men with all kinds of special skills and qualifications. This means that the managers themselves have to study the art of combining the best use of physical assets with a deep understanding of the human problem.—SIR DAVID ECCLES, Minister of Education.

It must never be thought that work study is a kind of magic pill which management may use when things are going wrong. Work study is a tool of management, and the success obtained by its use depends entirely on the way in which management puts the tool to work.—MR. J. DEMPSTER SMITH, *senior lecturer in the Department of Mechanical Engineering, Heriot-Watt College, Edinburgh.*

Could it be that science and industry are still very much out of favour with public schools today? I can assure you from my own experience that there are worthwhile opportunities in heavy as well as light industry even for public school boys.—MR. F. B. GEORGE, managing director, Consett Iron Company, Limited, in a letter to The Times.

My sponsors in Aims of Industry regard the current rates of company and personal taxation as an obstacle to free enterprise and so do I.—PROF. C. NORTHCOTE PARKINSON.

Out to Sell Coal

MR. ROBENS HITS THE HEADLINES

"ONCE we have cut down our stocks a bit more, we shall be able to increase coal output to a higher level; but it does not mean the industry is going to have an easy passage. Business won't fall into our laps. We must fight for it—and our opponents are powerful. Well, we shall fight for it. In the spring we shall launch a terrific sales campaign." These "fighting words" are written by Mr. Alfred Robens in the industry's own magazine, Coal, in his first article since becoming chairman of the National Coal Board.

Reminding readers that, in terms of improved productivity, coal has outstripped the rest of British industry since 1957, Mr. Robens emphasizes that it must continue because on the greater efficiency allied to productivity depends price, and upon price depends the future size of the industry and its ultimate prosperity.

Increased mechanization along with the modernization programme can keep coal prices where they are, he states, and the biggest power-loading drive the industry has yet seen is to be launched in 1961. "New pits, better pits, and safer pits for men to work in, with the best machines that can be obtained are the modern industrial weapons with which to fight oil. Properly used we're on a winner—we can't lose," he maintains.

Coal on HP?

The coal distributive industry was not a little surprised—and bewildered—on Monday to read in its daily paper that it was going to sell coal on hire purchase "early this year" and, from no less an authority than The Times, that "coal will be available on hire purchase from about April." The announcement that the NCB is to have talks at an early date with distributors to see how and when the scheme can best be put into operation has also been greeted with reserve by merchants. Their attitude was summed up by Mr. R. Matthews, assistant secretary of the Coal Merchants' Federation of Great Britain, who said the federation would be interested in any proposals the board might make and would be willing to look at them constructively—as it did with all proposals from the NCB.

"If the demand is there we can make the facility available," said Mr. K. M. Stobart, deputy chairman and joint managing director of Charrington, Gardner, Locket & Company, Limited, who pointed out that the purchase of coal by instalments was by no means a new idea, similar schemes having been known to the trade for very many years.

However, Mr. Robens' announcement, which "hit the headlines" not only in the Press but also on the BBC, served to focus a beneficial spotlight on coal, as also did his statement that a new kind of smokeless fuel—"unlike any other we have so far produced" was to be introduced on to the market "within the next few months."

The work that has been and is being done under the direction of Dr. J. Bronowski, NCB director-general of process development, in producing a marketable smokeless fuel is already well-known throughout the industry, reference having been made in IRON AND COAL as recently as last week to the progress being made at the pilot plants at Birch Coppice and Graigola. Several thousand tons of the new fuel are to be tested on the market in the near future and Mr. Robens forecasts production at the rate of 500,000 tons by 1963.

Speaking at the National Industrial Fuel Efficiency Conference in Glasgow on Wednesday—his first public engagement as chairman of the NCB—Mr. Robens tilted a lance at the import of oil into the UK. The effect of the oil industry's operations on the balance of payments was not revealed to the public, he said. He could not affirm categorically that the operations of the industry in 1959 or 1960 resulted in a very large net loss to Britain as far as oversea payments were concerned—but that was what all the available information suggested.

"What is indisputable is that every additional ton of imported oil adds to the burden of our oversea payments, for it is certain that during recent years the rate of increase in oil imports and in our payments for them has substantially exceeded the rate of increase in oil companies' oversea sales and earnings.

"As a nation we are engaged in a struggle to increase our exports in the face of powerful and growing competition. Must this struggle be made unnecessarily more difficult—which it is when oil imports displace home-produced coal?" he asked.

Mr. Robens went on to contend that no less than a quarter of the deficit on the 1960 balance of payments—which might be as high as £150,000,000 to £170,000,000—could be attributed to the increase in oil imports during 1960.

Referring more particularly to the coal industry in Scotland he said the £6,500,000 Lurgi gasification plant at Westfield (Fife), was among the first half dozen in the world and marked a major advance in the efficient production of heat and power in this country. Similar plants would be built elsewhere in Britain.

Scottish coals were being tested to see if they were suitable for the new high-quality smokeless fuels soon to be market-tested by the board. If the results were favourable plants would be erected north of the Border.

Reminding delegates to the conference that the NCB had contributed well over £1,000,000—half NIFES' total contribution income—towards its work, and if fuel saved was money saved, the board, he maintained, had been subsidizing private industry quite handsomely in the interests of fuel efficiency.

Although he warned that the industry carried a heavy burden of fixed charges which scarcely varied with output so that it had reached the stage where the less coal produced the dearer each ton became, he hoped that increased costs could be absorbed in greater efficiency. He did not want to see the price of coal go up while he remained in office.

Personal

Mr. R. H. E. Thomas Returns to Torquay

CAREER of Mr. R. H. E. Thomas, who retired as marketing member of the National Coal Board in June, 1960, has turned full cycle. He has rejoined, as commercial adviser, Renwick, Wilton & Dobson, Limited, coal distributors, of Torquay (Devon), with which company he started his career in 1912.

MR. R. H. E. THOMAS

Mr. Thomas founded Milner Thomas & Company, Limited, in 1921, and the company later absorbed Peake, Oliver & Peake, Limited. He served as managing director until 1946 and in the following year he became deputy director-general of marketing (commercial operations) of the National Coal Board. When the board was reconstituted in 1955, Mr. Thomas became a member with functional responsibilities for marketing and purchasing and stores. He also served as chairman of the Opencast Executive.

He is a director of Benzole Producers, Limited, a member of the British Coking Industry Association, and a past president of the British Tar Confederation, a director of the Coal Industry Housing Association, and of the National Industrial Fuel Efficiency Service. He has been a member of several British distributive organizations, including the Chamber of Coal Traders, and he was vice-chairman of the distributors' section of the London and South Emergency Advisory Committee during the war.

Newly-appointed Rector of St. James's Church, Gateshead, the Rev. ROBERT RACE was for 15 years a deputy at Elemere Colliery.

Warehouse packer at the Smethwick works of Guest, Keen & Nettlefolds, Limited, Cllr. RICHARD PRITCHARD, is to be the next Mayor of Smethwick.

Cllr. JAMES N. WELCH, an area manager for Keighley Lifts, Limited, lift manufacturers, of Keighley (Yorks), has been chosen as the next Mayor of Keighley.

Out of 380 apprentices at the Derby works of Rolls-Royce, Limited, Mr. MALCOLM RALPH SCOTT (22), of Thurnscoe (Yorks), has been chosen "Apprentice of the Year."

Prof. WILLIAM ALEXANDER DEER, Professor of Geology at Manchester University, has been elected to the Chair of Mineralogy and Petrology from October 1, 1961.

Mr. ROBERT APPLEBY has been elected to the newly-created office of executive vice-president—European operations—of the Black & Decker Manufacturing Company, of Towson, US.

Director of Hall & Goulding, Limited, wirework manufacturers, of Bognor Regis, Mr. L. JONES has been elected chairman of the West Sussex sector of the Federation of Sussex Industries.

THE DUKE OF EDINBURGH is to visit the research organization of British Insulated Callender's Cables, Limited, on May 16, and is open the McFadzean Laboratory at Shepherd's Bush, London, W.12.

Recently retired city architect to Hull Corporation, Mr. ANDREW RANKINE has been appointed building and architectural adviser to J. H. Fenner & Company, Limited, manufacturers of V-belt drives, of Hull.

Mr. R. S. FALK, director of Production-Engineering, Limited, and chairman of the British Export Trade Research Organization (1952), Limited, has been appointed to the Council of Industrial Design for a further period of two years.

Chairman and managing director of Anderson, Boyes & Company, Limited, mining equipment manufacturers, of Motherwell, Mr. JAMES Anderson has been appointed chairman of an organizing committee set up by the Industrial Training Council to convene a Scottish conference on industrial training.

Mr. J. HEWITT, who has been awarded the Hadfield Memorial Prize of the Sheffield Metallurgical Association, is a member of the research department of Steel, Peech & Tozer, branch of the United Steel Companies, Limited, Sheffield, and not of the Park Gate Iron & Steel Company, Limited, as stated in our issue of January 27.

Mr. ROLAND A. KIRBY, chairman of General Refractories, Limited, refractory materials manufacturers, of Sheffield, has been appointed by King Baudouin an Officer of the Order of the Crown of Belgium. Mr. Kirby has had business connections with Belgium since 1931 and for many years has been president of General Refractories' subsidiary company at Seilles-Andenne.

Mr. RALPH H. UNWIN, export manager of Newall Engineering Company, Limited, machine tool and measuring instrument manufacturers, of Peterborough, is a member of a good-will trade mission under the auspices of the London Chamber of Trade which leaves for Poland on Tuesday. The party has been invited to spend a fortnight in the country by the Polish Chamber of Foreign Trade.

The Minister of Power, Mr. RICHARD WOOD, has appointed Mr. CHRISTOPHER CHATAWAY, MP for Lewisham North, to be his Parliamentary Private Secretary. Mr. Chataway, who represented Britain at the Olympic Games in 1952 and 1956, held the world record for the 5,000 metres for a short time in 1954. Since his election to Parliament in 1959 he has been an active backbencher.

Sir ALEXANDER FLECK, FRS, former chairman of Imperial Chemical Industries, Limited, who was created baron in the New Year Honours List, has chosen the title of Baron Fleck, of Saltcoats in the County of Ayr. Mr. TOM WILLIAMS, who rose from a pit boy to become a cabinet minister, has chosen the title of Baron Williams of Barnburgh, of Barnburgh in the West Riding of the County of York.

After 40 years' service Mr. F. J. NEWMAN has retired from Pritchett & Gold & E.P.S. Company, Limited, accumulator manufacturers, of Dagenham Dock (Essex). He joined the Premier Accumulator Company, Limited, in 1919 and was closely associated with the design of the closed-top type cell. When Premier Accumulator was taken over in 1929 by Pritchett & Gold & E.P.S., Mr. Newman took charge of estimating work at the company's London office.

Cogging mill foreman at the Lanarkshire Steel Company, Limited, for the past 14 years, Mr. HERBERT PHILLIPS was guest of honour at a dinner given by the Motherwell works staff association to mark his appointment as mill foreman at Gartcosh steel works. Before taking up his new post he is to do five months' training with the Republic Steel Corporation, Cleveland, US, under a technical liaison scheme between the US concern and Colvilles, Limited, which owns Lanarkshire Steel.

Industrial Rerating

POSSIBLE EFFECT ON STEEL COSTS

INDUSTRY, and in particular, the steel industry, is not allowing the proposals under the Rating and Valuation Bill to go unchallenged. The letter in The Times from Mr. C. W. Wheeler, president of the British Iron and Steel Federation, which was referred to in our issue of January 27, has sparked off a vigorous correspondence. Mr. David J. Young, financial director and secretary of the Steel Company of Wales, Limited, challenges the contention that industry's share of the total rate burden is unlikely to increase under the legislation proposed and that the steel industry's expectation of increased costs " has no validity."

Mr. Young maintains that the most careful estimates of the position suggest that industry's relative share of the rate burden will increase to some extent. Another factor to be considered is the possible extent of domestic derating and Mr. Young does not think the Minister will fail to make substantial use of the powers to relieve domestic properties which are proposed in the Bill.

If as little as 25 per cent. domestic derating relief is granted, it is estimated that the steel industry's share of the effective national rating valuation could rise by about three quarters—from 0.9 per cent. to 1.6 per cent., he says.

Rate Cost Per Ton of Steel

Following from this, the rate cost per ton of steel would rise correspondingly, from about 8s. a ton to about 14s. a ton, even if total rate-borne expenditure d d not increase in 1963-64. If domestic derating were put higher than 25 per cent. on average, the increase in the rate cost per ton of steel would be even steeper.

The assurance that the tools of production were free from rating was impossible to accept, he continues. " The steel industry is assessed, among other plant, on coke-making, iron-making, and steel-making plant. This position has always been most inequitable: and the industrial derating which counters its impact ought not to be withdrawn without corresponding action to remove or reduce the inequity itself."

Mr. E. R. Mayer, president of the National Union of Manufacturers, deprecates the absence in the Bill of any powers for reducing industrial rating as have been provided for domestic derating and emphasizes that the political aspect of increased residential rates should not be allowed to obscure the possible need for helping industry to reduce costs in order to survive in the competitive export market.

Industry's apprehension of the effects of the Bill, especially where fixed plant represents a large part of the rating valuations is referred to by Mr. C. E. Harrison, deputy president of the Federation of British Industries. He contends that the justice apparently produced by the full valuation of all hereditaments, " always of the roughest kind," became quite spurious when the value of fixed plant reached a sizable proportion of the total valuation of industrial properties. " Some derating of industry always was necessary in order to produce equality—not to depart from it," Mr. Harrison says.

A Scottish FBI spokesman deprecated any minimizing of the effect the valuation changes would have on the country's competitive ability. The increased rate burden on industry would be reflected in the price of raw materials, machinery, and components " all along the line," he declared.

In the new rateable valuation in the reassessment of all properties in Scotland, Harland & Wolff, Limited, Glasgow shipbuilders, has had its assessment raised from £10,840 to £30,000. The company's foundry, which is separate from the shipyard, has been re-assessed from £7,031 to £26,500. British Polar Engines, Limited, has had its assessment increased from £2,824 to £10,118, and the Saracen Foundry of Walter McFarlane & Company, Limited, has been re-assessed from £2,390 to £13,100, Thermotank, Limited, Govan, from £539 to £2,313, and the offices of Stewarts and Lloyds, Limited, from £183 15s. to £1,500. Similar percentage increases are reported from Midlothian.

IME Associate Membership Examination

IN the examination for associate membership of the Institution of Mining Engineers held in November, 1960, the following were successful:—

H. T. Asbridge; S. G. Blethyn; E. Bucklow; G. Crompton; J. Cusick; G. G. Daniel; M. Deneley; R. S. Ferguson; S. K. Ghosh*; W. Gillespie; W. T. C. Gillespie; D. J. Graham; G. A. Gray; F. R. Hampson; J. W. Hayhow; C. Hibberd*.

F. J. Hutchings; S. S. Jha*; R. G. Keppie; P. King; G. Lewis; D. R. Liggett; E. G. Lomax; W. H. Miller; W. R. Morrison; R. Mullins*; P. H. Phillips*; A. E. Pickering; M. F. Pleming*; I. M. Pratt.

M. A. H. Price*; J. Readman; J. I. C. Reid; T. H. Rhodes; G. Richardson; K. C. D. Stobart*; J. Storey; J. D. Syson; W. H. Tattersall; G. D. Temperley; A. O. Utley; S. P. Varma*; G. Walker; M. Widdas; C. B. Williams*; R. L. Wilson.

The following candidates, previously referred in mining legislation, have now completed the examination:—

M. Barclay; E. J. Browning; P. J. Bumby; S. K. Chowdhary; D. B. Edwards; S. N. Jha; P. D. Nath; J. C. Pemberton; V. K. Sarna; P. M. Scott; K. Sedgebeer; B. Singh; M. Stevenson; W. J. Stott; D. N. Thomas; H. B. White.

The next examination will be held jointly with those of the Mining Qualifications Board on May 17 and 18, 1961, at the following centres:—Cardiff, Doncaster, Glasgow, Stoke-on-Trent, Sunderland, and Wigan.

Forms of application and full particulars may be obtained from the Secretary at 3, Grosvenor Crescent, London, S.W.1. The latest date for acceptance of entries is March 21, 1961.

* Subject to passing in Mining Legislation at the first-class certificate of competency examinations of the Mining Qualifications Board.

Board Changes

Holman Bros. Appoints Financial Director

FOR six years financial director of the British Aluminium Company, Limited, and director of a number of the group's subsidiary companies in the UK and Canada, Mr. James Ritchie has been appointed financial director of HOLMAN BROS., LIMITED, mining, iron, steel, and brass founders, of Camborne (Cornwall).

MR. JAMES RITCHIE

Mr. Ritchie's experience of finance, especially in oversea activities, will be particularly valuable to the company whose present expansion involves the formation of new oversea manufacturing and selling companies.

After qualifying as an accountant, Mr. Ritchie joined Price Waterhouse & Company at its Milan office in 1934. Returning to England two years later, he joined the newly-formed Accountancy Investigation Department of the Air Ministry. In 1939 he was appointed assistant secretary, of British Aluminium. At the outbreak of war, Mr. Ritchie was transferred to the Ministry of Supply, where he helped to form the Aluminium Control (subsequently Light Metals Control), and served as assistant controller until 1945.

Holman Bros. also announces that two of its associate directors, Mr. J. L. Ritchie, sales director, and Mr. J. M. Williams, London director, have been appointed directors.

WELLMAN SMITH OWEN ENGINEERING CORPORATION, LIMITED—Mr. D. L. Campbell has resigned from the board.

VICKERS-ARMSTRONGS (ENGINEERS), LIMITED—Mr. A. E. Riddell has retired as director in charge of the Weymouth works and from the board.

STAVELEY IRON & CHEMICAL COMPANY, LIMITED—Mr. W. N. Menzies-Wilson has joined the board and as from May 1 will become deputy managing director. Mr. S. W. Martin remains chairman and managing director.

INTERNATIONAL BOILERS & RADIATORS, LIMITED—Mr. H. A. S. Moule, formerly sales director of Glow Worm Boilers, Limited, and executive director to Sunrod Domestic Boilers, Limited, has joined the board.

BENGEWORTH STEELS, LIMITED—Mr. E. J. Ingram has been appointed managing director of the company and of Coltrate Metal Treatments, Limited. He was formerly steel buyer of the Ford Motor Company, Limited.

FORGROVE MACHINERY COMPANY, LIMITED—Mr. Hugh S. Ridley has joined the board. The company is a member of the Baker Perkins, Limited, group, which recently acquired Rose Bros., Limited, of which Mr. Ridley is chairman.

CHURCHILL MACHINE TOOL COMPANY, LIMITED—Mr. Eric Turner has joined the board and been appointed chairman. Mr. S. A. Roberts has been appointed a director and Mr. E. W. Hunnisette is to continue as managing director. Sir Greville S. Maginness, Mr. Paul Chamberlain, and Mr. Harold E. Churchill have retired from the board. These changes follow the acquisition of the company by the Birmingham Small Arms Company, Limited.

INTERNATIONAL NICKEL COMPANY OF CANADA, LIMITED—Mr. G. Arnold Hart, president and chief executive officer of the Bank of Montreal, has been elected to the board to fill the vacancy caused by the recent death of Mr. Edwin G. Baker.

INTERNATIONAL RECTIFIER COMPANY (GREAT BRITAIN), LIMITED—Mr. K. R. Simmonds has been appointed managing director of the company, which is jointly owned by Metal Industries, Limited, and the International Rectifier Corporation, of Los Angeles, US.

FERRANTI, LIMITED—Mr. R. M. I. Hobill has joined the board. He was appointed sales manager of the London area in 1946 and in 1951 became sales manager of the transformer department at Hollinwood, becoming manager of the department in 1958.

SIMON-CARVES, LIMITED—Mr. J. R. Rowlands, a director of Henry Simon (Holdings), Limited, and managing director of Simon Handling Engineers, Limited, has been appointed a director. Mr. G. P. Bridges, for many years manager of Simon-Carves' building department and a director since 1954, has retired.

FLETCHER MILLER, LIMITED—Mr. J. R. Bickerton, chief chemist at the Hyde (Cheshire) plant, Mr. J. Birchenough, works manager, Mr. R. A. Miller, north London divisional sales manager, and Mr. S. V. Tilley, senior technical representative for the Midlands and South Wales, have been appointed directors of the firm, a member of the Castrol, Limited, group.

Appointments

Mr. K. H. PLATT has been appointed to succeed Mr. B. G. Rossins as secretary of the Institution of Mechanical Engineers from June 1.

Mr. J. Y. MCDONALD has been appointed manager, diesel engines, at the Preston (Lancs), works of the English Electric Company, Limited.

Former industrial correspondent (City office) of The Times, Mr. ANDREW B. ROBERTSON has joined the British Institute of Management as head of the publications division.

Mr. GWILYM JONES has been appointed undermanager of Parc No. 3 Pit, Rhondda. He began his career as colliers' boy at Coedley Colliery, where he later became an overman.

Mr. COLIN G. KNELLER has been appointed advertising and sales promotion manager of the British divisions of Yale & Towne Manufacturing Company, lock manufacturers, etc., of Willenhall (Staffs).

Mr. R. H. NEWTON has been appointed works director of Aberdare Cables, Limited. Mr. NORMAN CARE, general manager of South Wales Switchgear, Limited, is to be responsible for co-ordinating the sales organization of home factories in the Aberdare Holdings, Limited, group.

Mr. I. THOMSEN has been appointed financial director and secretary of the Goodyear Tyre & Rubber Company (Great Britain), Limited, Wolverhampton, and Mr. L. A. GIBBS, assistant secretary, becomes an executive officer. Other appointments are: Mr. D. G. BIRCH, treasurer; Mr. J. N. LAW, assistant treasurer; Mr. N. H. SMITH, comptroller; Mr. D. N. CORNER, assistant comptroller, and Mr. R. SENIOR, chief accountant. Mr. E. SAMPLE continues as credit manager.

Stewarts and Lloyds

PROFITS WARNING: £35,000,000 EXPANSION PLAN

UNLESS the present trend in trade improves, profits of Stewarts and Lloyds, Limited, manufacturers of steel tubes, etc., will be lower this year, Mr. A. G. Stewart, chairman, said at the annual meeting on Wednesday. Home demand remained good, though there had been a decline in the export market for most types of tubes. It was hoped that this was only temporary, and the group intended to quote competitive prices wherever necessary.

Orders for the oil and natural gas industries had fallen—mainly because of lack of demand for line-pipe for large projects on which the group relied, said Mr. Stewart. Sales of other iron and steel products had been maintained in the first three months of the financial year, but it was too early to give any reliable estimate of profits for the current year.

With a view to expanding primary iron and steel making capacity, the board has approved a £35,000,000 plan aimed at increasing the capacity at the Corby works by 450,000 tons of pig-iron and 450,000 ingot tons of steel. No final decision had been reached as to the method of financing the project, said Mr. Stewart. It had to be looked at in conjunction with the £20,550,000 schemes of capital expenditure already authorized but unexpended at the end of the last financial year.

Four Year Phasing

Mr. Stewart said that the phasing of expenditure would cover a period of three or four years, and it would not be possible to finance it from internal resources. The board was in no doubt about securing the necessary finance for development, but much would depend on the phasing of the expenditure, the state of the market, and the company's liquidity from time to time. It could also rely in some measure, as in the past, on support from bankers.

The developments had received the approval of the British Iron and Steel Federation and the Iron and Steel Board, subject to clarification on some points of detail. In addition to increasing iron and steelmaking capacity, facilities would also be provided for rolling of the additional quantity of steel into billets and slabs and hot rolled strip for sale.

The project involves the construction of a new blast furnace, additional coke ovens and, subject to trials, the application of the oxygen lime injection process of steelmaking to the high phosphorus iron produced at Corby. Additional ingot reheating furnaces will be required at the heavy mills to increase ingot steel capacity, and additional facilities will be installed at the finishing end of these mills to provide greater flexibility in billet production.

The No. 1 strip mill at Corby will be enlarged and extended to produce strip up to 24 in. wide and with a minimum thickness of 0.08 in. The proposals also include the construction of a third electric resistance weld tube mill.

Mr. Stewart announced that the board had reconsidered its policy regarding the interim payment, and should any increase in the interim payment be made during the current year this would be solely with the intention of reducing the disparity between the interim and final dividends.

Coke-oven and Furnace Records at Appleby-Frodingham

NEW records have been set up at the coke ovens, ironworks and "Ajax" furnaces at the Appleby-Frodingham Steel Company, Limited, branch of the United Steel Companies, Limited. During the four weeks ended January 21, the coke ovens reached a new record with a make of 64,537 tons, the previous best being 64,253 tons. Two records were made in the ironworks. The ore dried during the four weeks was 170,103 tons against the previous best of 169,739 tons, and the iron make from all furnaces was 33,330 (33,240) tons.

In the Appleby melting shop the three "Ajax" furnaces broke their records. The "Q" furnace, which was lit on January 10, having been converted to the "Ajax" process, made 4,279 tons (4,031 tons previous best) in the week ended January 21. Another weekly record was made by the "L" furnace with 5,072 (5,067) tons, and the "N" furnace reached a four-weekly record of 21,342 (20,302) tons. This last record also broke the melting shop record for four weeks by any furnace, which was previously held by the "B" Ajax in the Frodingham melting shop with a make of 20,770 tons in May last year.

Work Study "Not a Magic Pill"

DISCUSSING the implications of work study for the foreman, Mr. J. Dempster Smith, senior lecturer in the Department of Mechanical Engineering, Heriot-Watt College, Edinburgh, said at an industrial course at Newbattle College, Dalkeith, on Monday, that if a new technique in industry is to succeed, it is essential that those most directly affected must be told why it is being introduced, and what benefits could be expected from it.

It was heard, Mr. Smith went on, only too often that a certain firm had engaged a consultant to introduce work study and things got worse instead of better, or results hoped for had not made themselves apparent. Lack of communication was often the cause of opposition and resentment.

HOLLAND'S second largest steel producer, Nederlandsche Kabelfabrieken (NKF), plans to treble manufacturing capacity within the next few years to 600,000 tons of raw steel a year. Extension plans include new mills for ingots and medium strip, and a blast furnace. Holland's next largest producer, Kon. Demka Staalfabrieken, plans to extend capacity to 150,000 tons of rod, light profiles, and wire by 1966.

Orders Placed

NINE FURNACES are to be supplied by Royce Electric Furnaces, Limited, for installation at the new factory being built at Basingstoke for Associated Transistors, Limited.

TWO EXPORT ORDERS from Belgium and Iran for data logging equipment have been received by Blackburn Electronics, Limited, a member of the Hawker Siddeley, Limited, group.

SEVEN 30-ton dumpers, worth over £100,000, have been ordered from Aveling-Barford, Limited, by R. A. Davies (Midlands), Limited, for its open-cast mining operations near Tamworth (Staffs).

EQUIPMENT for a sterilized milk factory in the Philippines has been ordered from the A.P.V. Company, Limited, by G. A. Machineries, of Manila. The order is worth approximatey £65,000.

SUPPLY AND INSTALLATION of the switchgear for 11 sub-stations providing power for Lagos, Nigeria, is to be undertaken by Associated Electrical Industries, Limited. The contract is worth £200,000.

RICHARD DUNSTON, LIMITED, shipbuilders, of Thorne, near Doncaster, have received an order from Simon Handling Engineers, Limited, Stockport, for a pontoon for a 300 tons an hour capacity pneumatic grain elevator ordered by the British Transport Commission at Hull.

AUTOMATIC PROPORTIONING EQUIPMENT for ingredients used in making rubber for footwear by Svit np, of Gottvaldov, Czechoslovakia, is to be supplied by Simon Handling Engineers, Limited, a member of the Simon Engineering, Limited, group. The contract is worth over £60,000 and was placed by Strojimport.

INDUSTRIAL STEAM GENERATING plant worth approximately £120,000 has been ordered from Clarke Chapman & Company, Limited, by Monsanto Chemicals, Limited. The installation will consist of a bi-drum oil-fired outdoor boiler with ancillary equipment to be erected at Monsanto's works at Ruabon, North Wales.

NEW NATIONAL STEELWORKS—Siderurgia Nacional—now under construction at Seixal, Portugal, will incorporate water- and weather-proofing products manufactured by the Ruberoid Company, Limited, London, S.W.1. Production is to start this year, with an initial output of 300,000 tons of rolled steel and plates, for internal consumption only.

SECOND CONTRACT in connection with the Richborough (Kent), power station has been placed with the Mitchell Construction Company, Limited, Peterborough, by the Southern Project Group of the Central Electricity Generating Board. Worth £33,000, it is for a 1,500-ton ash dust bunker, including all foundation work, drainage, and superstructure.

FOUR 180 mVA transformers for the Central Electricity Generating Board sub-station at Elland (Yorks), are to be supplied by the transformer division of C. A. Parsons & Company, Limited, Newcastle-upon-Tyne. The contract is worth over £500,000. The transformers are three-phase auto-transformers for inter-connecting the 275 kV and 132 kV grid systems.

FOLLOWING receipt by Wild-Barfield Electric Furnaces, Limited, Watford (Herts), of an order from the East Indian Produce Company, Limited, for a number of pit-type gas carburizing equipments to be installed at National Engineering Industries, Limited, Jaipur, an additional furnace was installed. The company has now received a further order for larger furnaces of nominal 36-in. dia. and 54-in. depth.

CHEMICAL ENGINEERING division of the A.P.V. Company, Limited, has received a £300,000 order from Bitmac, Limited, for the design, supply, erection, and commissioning of a benzole refinery to be installed at the Spencer Steelworks of Richard Thomas & Baldwins, Limited, Llanwern (Mon). The refinery will process 8,000,000 gallons of crude coke-oven benzole a year. APV will also be responsible for the plant's civil and electrical engineering.

TWO MEMBERS of the Hawker Siddeley Industries, Limited, group—Mirrlees, Bickerton & Day, Limited, and Brush Electrical Engineering, Limited—have won the contract to supply generating equipment for a £50,000,000 industrial development scheme in Mauritania, North-West Africa. Their plant will provide power for electrically-powered earth-moving and mining equipment at an iron-ore mine in the Khédra d'Idgil hills, on the western edge of the Sahara.

CONTRACT for a 5,500-ton lifting capacity box type floating dock has been secured by the Furness Shipbuilding Company, Limited, Billingham (Co. Durham), from Centromor, the Polish Government organization for the import and export of ships, floating docks, and marine equipment. The dock, to be designed by Clark & Standfield, Limited, London, will be 450 ft. long and 93 ft. wide, and will add to the shiprepairing facilities controlled by United Ships Repair Yards of Poland.

THREE COMPLETE cotton spinning factories worth £5,000,000, are to be built in Java by Platt Bros. (Sales), Limited, a subsidiary of Stone-Platt Industries, Limited, for the Government of Indonesia. Platt Bros. (Sales) will supply the spinning equipment to the value of £2,750,000; Associated Electrical Industries, Limited, will be responsible for the generating and electrical equipment; Mather & Platt, Limited, will be concerned with fire protection; and Hall & Kay, Limited, will carry out air-conditioning.

HYDRAULIC TURBINES, which will be among the most powerful in the world, have been ordered from the John Inglis Company of Toronto, Limited, division of English Electric Canada, Limited, by the Manitoba Hydro Electric Board. The contract is worth £1,000,000 and the turbines will be designed at the Netherton (Lancs), works of the company. The Hong Kong Electric Company, Limited, has placed an order worth £500,000 for a fourth English Electric 200 mW steam turbo-alternator, with associated switchgear and transformers.

Price War in Cable Industry "Costly and Senseless"

EXTREME features of the price war in the cable industry, now generally recognized to have proved a "costly and senseless tragedy," could have been avoided by earlier appreciation of the immense and purposeless damage which it was bound to inflict on the industry as a whole, says Mr. C. W. R. Pantlin, chairman of the General Cable Manufacturing Company, Limited, London, S.W.1, in his annual statement. In recognition of this fact lay the key to making permanently effective the steps that had been taken, after considerable delay, to restore the economic stability of the industry.

During 1960, says Mr. Pantlin, in which the company made a loss of £92,508 (reduced to £66,065 by recoverable tax), the cable group had borne the full impact of the price war which began prior to May, 1959, when "jungle warfare" developed, and subsequently extended over the whole range of its trading operations. Britannic Cables, Limited, which produced power cables, was now moving out of the conditions which seriously damaged its results in the past year, but trading difficulties and uncertainties still persisted in the rubber and plastic cables section.

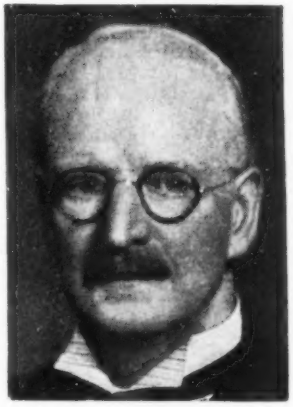
Obituary

LT.-COL. G. A. LEWIS

Half Century of Service to NACM

IN his 92nd year the death took place yesterday (Thursday) of Lt.-Col. G. Alfred Lewis, well-known in the mining industry—and particularly among colliery managers—for over 50 years. From 1904 until he relinquished the appointment to become honorary treasurer of the association, he served as honorary secretary of the National Association of Colliery Managers, and, in spite of advancing years, he continued to give another five years' active service to the association.

Born at Coleorton (Leics), he was educated at Derby School and Gonville and Caius College, Cambridge. A mining engineer by profession he was, prior to nationalization, chairman of both the Whitwick Colliery Company, Limited, Coalville (Leics), and the Wollaton Collieries Company, Limited, Nottingham. Later he acted as liquidator of both companies.



LT.-COL. G. A. LEWIS

When Col. Lewis gave up the secretaryship of the NACM in 1947 he was made one of its honorary members. He had also served for a term as its president. He was an honorary member and past vice-president of the Institution of Mining Engineers. His work for the Midland Counties Institution of Engineers was comparable with that for the NACM. He was its secretary for 47 years and had also served as its president.

He joined the Territorial Forces in 1888 and was appointed lieutenant-colonel in 1915, commanding a battalion of the Sherwood Foresters in the first world war. He was mentioned in despatches and made CMG. In 1948, in recognition of 50 years' service to the mining industry, he was made CBE. He retained a keen interest in the activities of the NACM and all aspects of the mining industry up to his death.

Founder of Walter Hindle & Company, sheet metal workers, of Lincoln, Mr. WALTER HINDLE has died at the age of 69.

The death has occurred of Mr. W. R. P. EVANS, well-known for 45 years in the Swansea coal shipping trade. In 1914 he joined the Cleeves Western Anthracite Company, Limited, and worked for the subsidiary, Cleeves & Jacqueline, Limited, dealing with the import of anthracite into France from Swansea. When the company was absorbed by Amalgamated Anthracite Company, Limited, he transferred to the shipping side of the business. On nationalization he became attached to the inland sales department of British Anthracite Sales, Limited.

The death has occurred at the age of 50 of Mr. WILLIAM L. MOULE, a director of Cannon Precision Tools, Limited, Ashton-under-Lyme.

Chairman and former managing director of Clapham Bros., Limited, gas plant manufacturers, of Keighley (Yorks), Mr. THOMAS A. CLAPHAM has died at the age of 80.

Mr. ARTHUR GILLOTT, who died recently at the age of 91, was for over 50 years a leader of the NUM. All his working life was spent with Newton Chambers & Company, Limited, as a miner.

Managing director for the past year of La Mont Steam Generator, Limited, Mr. WILLIAM MCKAY died suddenly last week at the age of 58. He had previously served as chief engineer since 1947.

Formerly works director in the drop stamping department of Ambrose Shardlow & Company, Limited, Sheffield, Mr. HERBERT WRIGHT has died at the age of 76. He retired in 1953 after 27 years with the firm.

Librarian of the Ministry of Power's Safety in Mines Research Establishment at Sheffield and Buxton, Mr. EDWARD B. SMITH has died. He was 44. Mr. Smith had organized and maintained the specialized library of the establishment and helped in the co-ordination of library facilities in Sheffield.

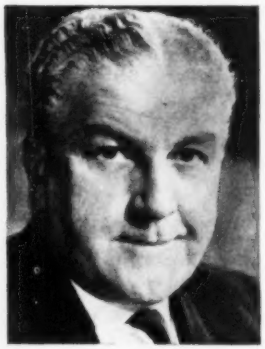
The death has occurred, at the age of 94, of Mr. SAMUEL T. COULSON. He was formerly chairman of the North Brancepeth Coal Company, Limited, and Richardsons, Westgarth & Company, Limited, and a director of Sadler & Company, Limited, and the Bearpark Coal & Coke Company, Limited.

Mr. WILLIAM H. WATKINS, who died recently, had been working underground in mines for 60 years up to his retirement from South Kirkby Colliery (Yorks). He was secretary of the Hemsworth branch of the Yorkshire Mineworkers' Association for 14 years and had been a member of the town's Urban District Council for 30 years.

Chief engineer of the No. 2 (Mid-East) Area of the Durham Divisional Coal Board until his retirement in September last year, Mr. WINSTON L. TULIP has died at the age of 66. He had spent more than 40 years in the mining industry. Mr. Tulip served from 1919 to 1947 with Lambton, Hetton & Joicey Collieries, Limited, and when the industry was nationalized he was appointed to the position he held until his retirement.

Confidence in Year Ahead at Newton Chambers

DESPITE cost rises in 1960, especially through the concealed wage increase which had come about through the reduction of the working week to 42 hours, the company was still spending on development and this was a sign that there was every confidence in the future, said Mr. P. J. C. Bovill, managing director of Newton Chambers & Company, Limited, at the annual meeting of the company's managers and senior staff.



MR. P. J. C. BOVILL

Mr. Bovill said he had just returned from the United States where there was some recession, with unemployment amounting to between 7 and 8 per cent. of the population. Nearly always, a recession which began in America crossed the Atlantic in due course, so that while he had no really bad apprehensions about 1961, he thought the going "might be tough." The company, however, had brains and ability at all levels of management, and the directors were not afraid to spend money or to take bold steps to further the interests of the group.

Steel Production Processes in West Germany

USE of the Siemens-Martin, Linz-Donawitz, and rotor processes of steel production are increasing in West Germany. Amount of steel made by the Thomas process has fallen, while electro-steel production has remained stable. A report on the industry by the West German Federal Bureau of Statistics shows that of the 34,100,000 metric tons of raw steel produced in 1960 (29,440,000 tons in 1959), Siemens-Martin steel accounted for 47.2 (45.8) per cent., Thomas steel for 43.7 (45.7) per cent., and electro-steel for 6.4 (same) per cent. Steel produced by the LD and rotor processes improved to about 3 per cent.

Of the 22,530,000 (19,350,000) tons of rolled steel produced during the year, 45.6 (44.6) per cent. was of flat products. Output of hot and cold rolled sheet rose by 22.7 per cent., boiler plates by 16.3 per cent., hot-rolled strip by 16.6 per cent., iron and steel bars by 18.1 per cent., and structural sections, including wide-flanged beams, by 20.8 per cent. There were production increases of 9.1 per cent. for rolled wire and 8.2 per cent. for steel piling. Production of railway track material fell by 10.2 per cent.

JAPAN'S FERROUS METAL industry produced 22,140,000 metric tons of raw steel in 1960—a rise of 33.2 per cent. over the previous year. Pig-iron output rose by 25.9 per cent. to 11,900,000 tons, and output of rolled steel products rose by 32.7 per cent. to 15,360,000 tons.

Ashmore Benson Pease Sells Foundry

FOUNDRY business of Ashmore, Benson, Pease & Company, Limited, is to be sold as a going concern to Parkfield Foundries (Tees-side), Limited, which was recently registered as a private company to make precision castings. Within the next two to five years the new company will obtain possession of all the factory buildings and offices at the Parkfield East works, to enable it to expand its activities in the production of high-duty iron castings manufactured by the Meehanite and spheroidal graphite iron processes.

Arrangements are being made for the licences currently held by Ashmore, Benson, Pease for these processes to be transferred to Parkfield Foundries, which is also to assume existing contracts held by Ashmore, Benson, Pease.

Mr. G. T. Cantlay, a director of Cambrian Castings, Limited, and Dock Grinding & Engineering Company, Limited, has been appointed chairman of Parkfield Foundries, and Mr. G. B. Taylor, who has been sales manager of the works division of Ashmore Benson Pease, has been appointed managing director. Other members of the new board are: Mr. Anthony Berry, Mr. E. K. Gould, and Mr. G. Hobman. Parkfield Foundries will take on most of the staff and workpeople at the foundry and it is expected to begin trading on Monday.

Steelworkers Laid Off Through Shortage of Pipe Orders

FALL in demand for large-diameter steel pipes has led the South Durham Steel & Iron Company, Limited, to give notice to 114 workers at its West Hartlepool works. The company stated last Friday that after consultations with the unions, there had been a "balancing-up" of production and manpower. Of the men involved, 36 were over 65 and had been retired on pension. Others had up to six months' service, but the majority had less than three months.

One of two blast furnaces at the Wellingborough Iron Company, Limited, will be shut down at the end of the month because of a shortage of orders for pig-iron, and 60 workers will become redundant.

Reduced Sales and Profit by Algoma Steel

IN spite of a successful entry into oversea markets (one third of steel deliveries were exported), reduced sales and profits were shown by the Algoma Steel Corporation, Limited, of Canada, in 1960. Net sales were Canadian $140,876,000 ($162,696,000), and after tax of $8,800,000 ($14,175,000), net earnings were $13,253,000 ($17,606,000).

Pig-iron production was 1,427,000 (1,552,000) tons, and ingot production 1,278,000 (1,372,000) tons. Deliveries of iron and steel totalled 1,306,000 (1,489,000) tons. Trial rollings at the corporation's new universal beam mill will take place this month.

VERDICT of Accidental Death was recorded on Mr. John George Allen (52), a miner, who was killed in an accident at Cwm Colliery (Glam), when he was knocked down by a runaway journey of trams.

A paper outlining the need for concentration of output at collieries and the methods and problems of obtaining the best results was presented to the Southern Counties Institute of Mining Engineers on January 13, 1961, by the new production director of the North-Western Divisional Coal Board. The paper is given here in abridged form. The full text will appear in the Mining Engineer, published by the IME.

Concentration of Output at Collieries

Increasing Efficiency in Coal Mining

by E. J. KIMMINS, B.Sc., M.I.Min.E.

AT nationalization of the British coal-mining industry there was a total of 948 collieries, excluding small mines, distributed throughout the country. At the beginning of 1960 there were 737 collieries in nine separate divisions. Many of these pits are over 50 years old and some upwards of 100 years. A large number are small, inconveniently shaped, and unsuited to layouts from which high outputs from concentrated areas can be obtained and maintained for reasonable periods. With such a large number of collieries concentration presents a very complex problem.

In Great Britain the bulk of the total cost of producing coal is made up of wages and associated charges (almost 59 per cent.) and materials repairs and power (about 22 per cent.). Of the total number of workmen 38 per cent. is at the coal face, the remaining 62 per cent. being employed on services supporting the face. Thus, dispersal of effort and workings inevitably means an excessively high cost in manpower, materials, maintenance, and power.

The year 1957 brought a big change in the general economic climate and the reduced demand for coal which became evident at the time continued and resulted in over-production and subsequent stocking. The need to achieve a better balance between supply and demand and to reduce stocks meant a more compact industry, but overhead charges and the demands of a policy of progressive improvement for those employed in the industry do not adjust themselves to a reduction in sales. It is therefore imperative, more than ever before, that attention be concentrated on improving efficiency. This is particularly true if we are to meet the intense competition from other sources of energy.

The aims of concentration are not only to increase efficiency and productivity and thereby improve the cost of production but also to concentrate production in the best quality and most marketable seams. Experience during the last two decades may well have blurred the one-time clear picture of the task of production:—(*a*) To produce what the market requires and (*b*) to produce coal as cheaply as possible.

Unfortunately, there is not always complete identity of interest between these two factors and this conflict poses many problems, the solution of which is far more complex in practice than in theory. It is often the case that there is no ready market for the coal that is won most cheaply and that the coal for which there is a ready market is expensive to get. It is also generally true to say that the production switch necessary to provide the required quality and quantity of coals in the right places tends to have an adverse effect on productivity. Manpower must be redeployed in many places not only within the pits or from one pit to another but also from one area to another.

The National Coal Board has a special responsibility for the social consequences of its policies and redundancy must be avoided where possible.

To measure the effect of concentration within the industry the following basic data are collected from each colliery:—(*i*) The total length of coal

face (x), (*ii*) the total length of main haulage roads (L)* and (*iii*) the pithead output (O).

From this data it is possible to derive "indices of concentration," these being:—

(*a*) The ratio of face lengths to length of main haulage roads—this represents the "geographical concentration" of a colliery.

(*b*) The ratio of pithead output to length of face—this represents "face concentration."

(*c*) The ratio of pithead output to length of main haulage roads—this is the product of the first two indices and represents the "overall concentration" of a colliery.

A sharp increase in (*b*), if due to a reduction in total face length, will result in a decrease in (*a*); in such circumstances the test lies in (*c*).

The national trends in these three indices since 1951 are shown in Table 1.

TABLE 1.—*Changes in Indices of Concentration.*

Concentration index.	1951.	1954.	1957.	1958.	1959.
Geographical (yd. of face/yd. of main haulage) $\frac{x}{L}$	0.1428	0.1482	0.1478	0.1479	0.1462
Face (ton/yd. of face) $\frac{O}{x}$	317.3	318.8	319.2	327.8	344.6
Overall (ton/yd. of main haulage) $\frac{O}{L}$	45.31	47.25	47.19	48.49	50.40

Despite the deterioration in geographical concentration since 1954, the improvement in face concentration has been sufficient to result in a nett improvement in overall concentration. Nevertheless, the fact that there was a deterioration in geographical concentration needs some examination, for at first sight it appears that we have failed in this particular direction.

The obvious explanation would be that diffusion as opposed to concentration has taken place. At the same time, however, it is important to remember that the various indices are interdependent to a certain extent and a worsening geographical index can result from a substantial improvement in face concentration. If the same output is obtained from a given district by working fewer faces, *e.g.*, as a result of mechanization and increased rate of face advance, then the geographical index will decrease. At the same time closure of ageing pits will necessarily have an effect on the overall figures.

The first way to achieve concentration is by new pits or reconstruction of old pits. Table 2 shows the concentration indices in 1959 for 102 reconstructed collieries and an example of a new colliery compared with the national figures given in Table 1.

TABLE 2.—*Concentration Indices in 1959 for 102 Reconstructed Collieries.*

Classification.	Geographical concentration.	Face concentration.	Overall concentration.
New colliery ..	0.4560	415.1	189.28
Completed major reconstruction ..	0.1640	362.6	59.45
All collieries (from Table 1)	0.1462	344.6	50.40

We cannot afford, however, to rest on benefits to be expected from future reconstruction work. Concentration must also be a prime concern in short-term planning.

Geographical Concentration

In an extractive industry the natural tendency is for geographical concentration to worsen. At the same time the problem of concentration is accentuated by the need to work different seams and districts. Apart from the small number of new collieries, there are few pits with large reserves of coal within easy reach of the shafts. Notwithstanding these difficulties, improvements can be and are being made, not only in the newer coalfields but also in the older declining coalfields.

Generally speaking, the greater the dispersion of the workings, the greater the unproductive manpower employed and the higher the costs of production. It would seem reasonable to expect that an improvement in geographical concentration will bring an improvement in haulage m.s.t. and consequently in transport costs.

Study of the details for the years 1957, 1958, and 1959 shows, however, no apparent direct connection between geographical concentration and haulage m.s.t. This is clearly because we are looking at a period when savings in the manpower employed on haulage were being effected by a sharp reduction in the labour force, a phenomenon which cannot continue indefinitely.

The fluctuations from year to year confirm that the dominant factor influencing haulage m.s.t. was the availability of manpower. For example, haulage m.s.t. improved substantially in all divisions during the period of manpower rundown, including the Scottish, North-Eastern, and West Midlands divisions, where geographical concentration deteriorated. There would therefore seem to be further scope for improvement in haulage m.s.t. in these divisions if geographical concentration could be improved. At the same time, however, while rates of improvement are relative, the absolute values of the geographical index should not be forgotten.

Apart from improvements in geographical concentration, technical developments in underground haulage which have influenced haulage m.s.t. include the increased use of locomotives and of trunk conveying and the reduction in the number of loading points. Nevertheless, the significant change in haulage m.s.t. in 1958 to 1959 was not so much associated with any sudden technical change, as with the reduction in manpower.

Developments in Transport Concentration

With increased concentration and mechanization at the face it is of the utmost importance that the haulage facilities of a colliery can handle the fluctuations in output throughout the shift. It is probable that inadequacy of the haulage system is one of the main causes of delay at the face.

Rope Haulage.—The quantity of coal handled

* From 1960 onwards the geographical index is based upon the total length of haulage, *i.e.*, the length of roadway traversed by the coal in the flow from the coal face to the shaft, no length of haulage to be counted more than once.

by rope haulages is steadily decreasing, although in 1957, 50 per cent. of the output was still transported in this way. Endless rope is the most commonly used type of rope haulage and, if given the same standard of maintenance, it can be competitive with the more fashionable forms of haulage. Unfortunately, the standard of track laying is often very different from the standard provided for locomotives. If the effort put into the maintenance of locomotive roads was given to rope haulage very much better results would be obtained. Similarly, more thought about the use of automatic attachment and detachment of tubs, the possible use of mine cars instead of tubs, and the elimination of sharp bends and gradients would all help towards the more efficient use of existing facilities.

Conveyor Transport.—There has been a steady increase in the use of trunk conveyors during recent years. Although there have not been any major changes, substantial improvements have been made in the quality of conveyor belting, while widths and speeds of belts have tended to increase to match greater concentration in output. PVC belting is now universally applied, being not only fire-resistant but equal, if not better, in quality than the rubber belting previously employed. It is now possible to use up to 300 h.p. with 36-belts and up to 400 h.p. with 42-in. belts.

The use of cable-belt conveyors has been increasing; there were 38 in use in the second quarter of 1960. These are low in depreciation and maintenance costs and have other advantages such as high carrying capacity, less tendency for spillage, and long life. They also eliminate transfer points and can be used for long hauls against steep gradients. Plate conveyors are becoming less popular owing to their high first cost, consequent depreciation, and heavy maintenance cost. New installations are now only introduced for special application where other types are not suitable, such as for short gathering conveyors and on gradients too steep for other types.

The relative costs for replacements and capital charges of cable belt conveyors, plate conveyors, and the high horsepower conventional belt conveyors in the second quarter of 1960 are given in Table 3.

TABLE 3.—*Costs of Special Roadway Conveyors.*

Type of conveyor.	Costs per ton/mile.	
	Replacements.	Depreciation and interest on capital (including the cost of extensions).
	pence.	s. d.
Cable-belt conveyors	0.97	0 6.98
Plate conveyors	5.18	1 6.29
High-horsepower conventional belt conveyors	0.11	0 5.46

Locomotive Haulage.—The use of locomotives underground has also been increasing steadily in recent years and, with trunk belts, they form one of the best methods of dealing with high outputs. With more concentrated working, locomotives are being called upon to handle increasingly heavy loads and several interesting developments have taken place.

For heavy haulage duties trolley or diesel locomotives are used; the battery type is not suitable in such conditions. The heaviest duty for a locomotive in a British mine at present is that at Silverwood Colliery in the North-Eastern Division where 25-ton, 190-h.p. trolley locomotives haul the mineral outbye up gradients of the order of 1 in 30. Two locomotives are used in tandem on a train of 18 5-ton capacity mine cars weighing a total of 135 tons. The total weight of the train, including the locomotives, is 185 tons.

In the case of diesel locomotives probably the most severe duty is at Yorkshire Main Colliery, also in the North-Eastern Division, where two 15-ton 100-h.p. diesel locomotives are operated in tandem over a haul of three miles with a train of 12 loaded mine cars up a gradient which at its steepest point is 1 in 21 and in general is not less than 1 in 30.

The most efficient form of haulage is, without question, the electric trolley type, particularly where the application involves heavy loads against steep gradients. It is often high in capital cost, but, judging from the very limited experience, the operating and maintenance costs over a term of years are extremely low.

Mine Car Trends.—In an increasing number of cases new and reconstructed mines are equipped for mine cars of about 3-ton capacity/1½ tons tare. In some cases slightly smaller cars are preferred and at the other end of the scale there are one or two installations using cars with a capacity of 6 tons. The size of the car has a consequential effect on the rest of the handling equipment and, as a result, the larger sizes have not held favour. In general, also, the solid car is now preferred to the drop-bottom type.

Problems of Peak Loading

Peaks in output are almost bound to occur at some period during the shift and concentration accentuates the effect of this. It is clearly uneconomic to design the whole of the transport system for such peak loading, and some form of storage is highly desirable in the system. This can take the form of a natural bunker driven through the strata at about 45 deg. to the horizontal, spiral chutes contained in staple pits, a number of mine cars or bunker conveyors.

Bunkers should be designed so as to interfere as little as possible with the simple flow of coal when the function of storing excessive peak load is not required. Bunker conveyors would seem to have advantages over any form of vertical or inclined bunkers in this respect. This is most important in order to reduce degradation of the coal to a minimum. A further desirable feature is the ability to screen the coal before bunkering excess quantity so that small coal is bunkered while the large coal continues by a direct route.

It would seem to be wrong to think of bunkers simply in terms of a high-capacity bunker immediately before some critical limiting factor such as the shaft or the coal preparation plant. Such a

line of thought pre-supposes a trunk conveyor deliberately designed to the maximum combined peaks of the whole transport system and does not help with minor inbye stoppages.

A new development in No. 5 Area, East Midlands Division, is to supplement the pit-bottom bunkers by equipping the gate end of every face conveyor system with its own small bunker with a capacity of 20 to 30 tons. This takes the form of a length of conveyor chain in high-capacity pans arranged under the jib end of the gate conveyor. When the trunk conveyor cannot handle the load from the gate conveyor the bunker chain is slowly drawn back carrying about 1 ton of coal/yd. of chain, by a main-and-tail rope hauler. The bunker is subsequently discharged by reversing this process. When the bunker chain is not in motion the coal from the gate conveyor flows over the naturally formed cushion of coal on the bunker chain and the trunk conveyor. This has been found to cause very little degradation.

While new and expensive equipment can be used to increase the capacity of a given haulage system, this is not always necessary, as the use of method study has frequently shown. For example, a simple study was recently made at a large colliery producing 3,500 ton/day in connection with a new skipwinding and underground tippling plant associated with a locomotive haulage system.

The output was required to be hauled from two loading points situated, respectively, 3,000 ft. and 8,000 ft. from the pit-bottom tipplers. The study showed that under the existing arrangements, with two locomotives working on three shifts, there was over 46 per cent. of ineffective locomotive time and that the duties required, allowing adequate time for locomotive maintenance, could be adequately covered in two shifts with only one of the locomotives required for manriding and stone handling on the third shift.

Face Concentration

It has been shown that improvement in overall concentration in recent years has been principally due to improvements in face concentration, although there still appears to be much scope for improvement. Factors affecting the yield from longwall faces in each of the main divisions are set out in Table 4.

It will be seen that, although occupying approximately middle place in average seam thickness, the East Midlands Division had by far the highest output per yard of face. This division's pre-eminence in face concentration is even more strikingly reflected in the output per foot of seam thickness per yard of face. Both these indices reflect the division's high rate of daily face advance. The Northern (N & C) Division with the thinnest average seam thickness appear in third place when it comes to output per foot of seam thickness per yard of face.

Quite apart from the need for continually increasing the efficiency of mining operations in order to remain competitive, concentration has an important role to play in terms of overall output. The present situation is one of decreasing manpower. Uneconomic pits have been and are being closed, with the inevitable result that productive capacity is being lost. It is hoped, however, that the demand will not continue to drop and when it picks up there must be sufficient flexibility to be able to meet the change immediately.

In the past the mining industry has suffered through the lack of flexibility in operations and there has always been a considerable timelag in matching supply to changes in demand. One of the main aims today is to increase the degree of flexibility as far as possible. We must face up to the fact that we no longer monopolize the power market and that we must be prepared to meet increasingly intense competition from other sources. If we cannot meet the demand when it occurs markets will assuredly be lost.

The question to be solved is how to increase the flexibility of the industry. To a certain extent stocks will act as an immediate buffer to any sudden increase in demand, but it would be folly to place too much reliance on this; in any case, when the demand does come we cannot expect to be able to match it quality by quality from stocks alone.

The increased efficiency derived from concentration would in itself increase capacity to some extent, but much more can be achieved in this direction than by merely stimulating interest in concentration. There are examples in this country of faces producing very high outputs and it would be reasonable to assume that suitable conditions must exist elsewhere to allow similar results to be achieved. One method of achieving a reserve of

TABLE 4.—*Factors Affecting Output from Longwall Faces.*

Division.	Output/yd. of face in 1959 (tons pithead).	Output/ft. of seam thickness/yd. of face in 1959 (tons pithead).	Weighted average seam thickness (in.).	Average face length (yd.).	Average advance per day (in.).	Mechanization, per cent.
East Midlands	425.3	106.3	48	187	48.5	55.4
North-Western	369.9	80.7	55	151	37.9	37.8
West Midlands	349.8	75.0	56	158	39.4	24.2
South-Western	328.2	70.3	56	124	30.8	20.0
North-Eastern	325.0	84.8	46	161	41.9	28.1
Scottish	317.6	86.6	44	118	41.8	23.3
Durham	273.8	84.2	39	135	37.5	22.8
Northern (N & C)	268.4	89.5	36	108	38.1	21.1
Great Britain	342.8	85.7	48	144	40.0	31.8

capacity would be to find out which collieries could cope with really efficient and high-speed faces working on two or three shifts. Selected faces in such collieries could then be brought to maximum operating efficiency working on a one shift basis and leaving the other shifts in reserve to be used as need arises.

If a full-scale exercise were carried out to determine the number of pits capable of working large production units and every opportunity taken forthwith to concentrate to the full, the increase in total output might be embarrassing. For obvious reasons all the less-efficient pits cannot be closed and production concentrated from the most efficient, for this would lead to redundancy in the short term followed by a serious manpower shortage later when output is required to expand. This would give us less flexibility rather than more.

Selection of Faces

Faces which are suitable for intensive concentration should be selected now while supply still exceeds demand. Where this selection, which must be on technical grounds, coincides with current demand, every effort should be made to take immediate advantage of the benefits to be obtained by concentration. Where the type of coal is not in immediate demand careful thought should be given to whether to concentrate in the interests of short-term economy, abandoning the capacity of other faces, or whether to continue as a manpower reservoir and at the same time organize for future concentration. Then, when the demand changes appreciably, output could either be concentrated to expand or concentrated to contract.

There is room for more efficient operation of coal-face machinery and the necessary interest could be stimulated in a similar way to that employed in tunnelling. Four years ago tunnelling techniques, on the whole, were not very efficient and a drive was made to bring about improvements. A study was made of hydro-electric tunnels together with tunnels on the Continent to find out why they were achieving so very much better results than Coal Board tunnels. The main conclusion was that, although the equipment was roughly the same, the organization and supervision were much superior. A national demonstration tunnel was set up early in 1957 to show what could be achieved using simple equipment with the proper degree of organization and supervision and, following this, divisional demonstration tunnels were set up in which to train tunnellers. A similar approach to coal-face working would surely bring about improvements in results by drawing attention to the very best performances obtained and also to the worst performances. It is not suggested that all faces could emulate the record breakers; rather it is suggested that there is room for general improvement by learning and, wherever possible, applying the lessons of the best faces.

Feasibility exercises have shown that it should be possible to achieve 500 ton/ft. of seam thickness per day on one face. The only machines which could achieve this at the present time are the Anderton shearer and the rapid plough, and these would require three coal production shifts per day. Both these machines have their limitations; the Anderton shearer cannot be used in seams below about 2 ft. 6 in. thick, and even the most modern machines cannot cut at the required speeds in seams of about 5 ft. or more in thickness, unless a small-diameter drum can be used in cases where the top coal is free falling, or the coal is very soft.

In most cases it would be essential to achieve positive extraction of the whole seam on such highly concentrated faces, which implies the use of a drum large enough for this purpose, but British seams are generally too hard to allow high cutting speeds in such circumstances.

The positive extraction range of the rapid plough is between 1 ft. 3 in. and 2 ft. 9 in. and, like the shearer, it depends upon free falling to top coal if high outputs are to be achieved in the thicker seams. It also requires a readily ploughable seam. Another problem with the rapid plough is that although it is potentially the most productive machine for seams below about 2 ft. 6 in. thick, the outputs which can be achieved in such thin seams are comparatively low, and these outputs are insufficient to enable low face costs per ton and high productivities to be achieved.

A new machine capable of giving high outputs and low face costs from seams below about 2 ft. 6 in. and above 5 ft. is therefore needed. Much thought has been given to this problem. It may be that a new design of trepanner is required for the thicker seams, taking a 3-ft. web instead of the present 2 ft. to 2 ft. 3 in. and having a higher cutting speed.

Problem of the Thinnest Seams

The thinnest seams are a much more difficult problem, and it may be that an entirely new conception of mining is required, as the longwall system cannot be adapted to achieve the required levels in output, productivity, and costs. One power-loading system envisaged is " mole " mining, and NCB engineers are actively developing the required equipment based on experience already gained with the Collins miner. In this system a small auger type of machine taking headings of coal about 6 ft. 6 in. wide and to the height required, say, 2 ft. 6 in., will be advanced in the seam from the sides of a preformed roadway, for a depth of about 100 yd. This machine will be remotely controlled from the roadway, and no supports will be required as pillars of coal will be left between the headings to prevent the roof from collapsing.

The machine will be advanced and retracted automatically by means of an extensible push-rod system and an extensible conveyor will be incorporated. It is calculated that the o.m.s. achieved may be in the order of 20 tons, assuming 200 to 300 yd. of cutting per shift, including the manpower employed in driving the roads and in stowing the headings. The total face labour cost could on this basis be between 3s. 6d. and 7s. 6d. per ton, com-

pared with the present average mechanized figure in the same seam thickness of about 20s. per ton.

In British mines it is desirable that as much stone as possible should be packed or stowed underground owing to difficulties in finding tipping space on the surface, the objections raised by local authorities to making such tips and the cost of surface dirt disposal.

The predominant system of mining in Britain is longwall advancing, with the roadways made by ripping behind the faces and packing the stone on the faces themselves. The maximum advance which can usually be ripped in one shift is about 6 ft., so ripping must take place on the coal production shifts if multishift working of the power loader is practised. It is considered that it is not practicable to operate on more than three 6-hr. shifts per day, as four-shift operation would allow no time to catch up with delays which may occur.

Maximum Daily Advance

This implies a maximum daily advance of 18 ft./day with orthodox ripping methods, corresponding to a rate of face advance by the power loader of 6 ft./shift. The capacity of an Anderton shearer loader (cutting at 10 ft./min.) is effectively utilized in advancing a face 250 yd. long between stables at the rate of 6 ft./shift and that this combination yields 500 ton/day/ft. of seam thickness. If a ripping advance of 18 ft./day cannot be maintained a longer face would be necessary to make full use of the power-loader capacity.

Orthodox ripping methods can be applied in virtually any seam thickness, but they are wasteful in manpower, particularly in the thinnest seams when the quantity of stone to be disposed of is higher than in the thicker seams and the space available is correspondingly lower. One system which is widely applied in seams under about 4 ft. thick is slusher packing, which has the advantage that it saves manpower at very modest cost in equipment. Nearly 700 slusher packers are at present in use.

Conventional ripping, with or without slusher packing, is not suitable for faces advancing at the rate of over 18 ft./day, and in such cases complete mechanization of roadway drivage is required. Mechanized advance headings should be able to achieve rates of advance equivalent to tunnelling operations, and they also have the advantages that the roadhead can be kept away from the entrance of the face and worked independently, and more headroom is available for the conveyor driveheads and other equipment.

Each heading can be worked in the same way as a mechanized development roadway, using mechanical loading apparatus, the only real difference being that the stone produced will have to be stowed on the face by pneumatic or mechanical methods instead of being sent out of the district.

Longwall retreating is very attractive when the seam is thick enough for roads to be driven mechanically wholly in coal as the face can be retreated between ready-made roads and the face advance is not limited by the rate of roadway drivage. Other advantages are that the area to be worked can be proved before the faces commence, and there is no ultimate drawing off cost.

Continuous miners can advance at the rate of 10 yd./shift or more, so roads for retreating faces can be driven at the rate of at least 30 yd./three-shift day, provided that the road is driven in coal only or the material above or below the seam is soft enough to be extracted by the continuous miner. There may be, however, problems in convergence of the roof or floor lift, not only during the period when the heading is being driven but also while the face is being retreated due to the effect of the front abutment zone. In this connection one might consider retreating the faces for shorter distances than the usual conception of face life at as rapid a rate as possible.

A different picture emerges when the seam thickness is such that a considerable thickness of stone has to be extracted. If this stone is too hard to be taken with a continuous miner, or must be kept separate from the coal due to washery, or other problems, the problem of dirt disposal is immense. Surface tipping, when it is allowable, is an expensive process, and additional costs are incurred in transporting the stone out of the mine, particularly as it would be impracticable to move it along the roadways, which are carrying large quantities of coal, possibly on three shifts daily.

The only other means of disposing of this stone is to keep it in the mine, and the most practicable way appears to be to stow it on one of the faces, the length and rate of advance of which would have to be controlled by the quantity of stone produced. This would also involve considerable stone handling problems, particularly if the faces were retreating on three shifts, and separate roadways would have to be used for stone transport.

A stone preparation unit would have to be provided at the stone disposal face and retreated with the face, the equipment required including a crusher, a stower, a blower, and the ancillary equipment. All the operations required to keep the faces operating would have to be integrated very closely, and this would impose a considerable load on management.

Stable Hole Efficiency

The longer the face, the lower is the proportion of total face length occupied by the stables. At the same time, the rate of face advance decreases with increasing face length and the work in the stables becomes less efficient because the number of men required does not decrease in proportion to the reduced rate of advance. This loss in stable hole efficiency can be corrected in cases where the advance required is only about 12 ft./day by working the stables on two shifts instead of three for the same daily advance.

Stables should not in any case be worked on more than three 6-hr. shifts/day as four-shift operation leaves no margin for delays. Thus stables extracted by the normal methods of cutting and

blasting, pulsed infusion or pneumatic picks, limit the daily advance of the face to about 18 ft., although advances greater than 6 ft. in a shift have been achieved. At the present stage of mining methods the limitation is the same as that imposed by ripping and leads to the same calculation of the necessary face length.

Stables worked by conventional methods are costly in manpower, the number of men required being considerably greater for 15 to 25 yd. of face than for the whole of the power-loaded section using powered supports. Considerable attention has been given to this problem, and a NCB engineer has invented the Dawson stable hole machine. This machine has its own conveyor and extracts the coal in a series of very narrow strips by means of rotating arms carrying cutting picks. The prototype has given encouraging results and it is expected that it will reduce the manpower required in stables considerably.

Strata control must be carefully considered, for the length of face is important in determining the extent to which the strata are broken in advance of the working face. Once a better understanding of the stress distribution caused by the working of a longwall face has been obtained it should be possible to design support systems to resist any movement caused by the change in stress and it should be possible to work and support any length of face. Nevertheless, while the long face has certain advantages, its advance can be so slow as to cause strata control problems to develop both on the face and in the roadways. On the other hand, the faster the rate of advance, the greater is the rate of disturbance in the strata above and below the seam. This does not usually affect the face (where conditions tend to improve) or ribside roadways, but it can cause severe damage to any between gates. Rapidly advancing faces are better without these gates and this may impose a limit to the total length of face worked.

For maximum output the power loader must not stop during the working shift and all obstacles which impede its steady and continuous progress must be removed. The attainment of this objective is greatly helped by self-advancing supports and an investigation into productivity on powered support faces in the East Midlands Division reveals that in general they are some 20 to 30 yd. longer than when using conventional yielding props. Thus, concurrently with the application of powered supports, overall productivity has increased and there is little doubt that their wider application will lead to greater concentration which will readily repay the higher capital costs involved.

At present, all the powered supports in use are controlled by valves situated on the support units themselves, an operator moving along the face to advance each unit in turn. This obviously presents a lesser problem than does the advance of a prop and bar system for thin seams and long faces, but with the increasing speed of power loaders (speeds in excess of 18 ft./min. are expected) even this form of advancing supports will not be fast enough.

Consideration must, therefore, be given to the use of automatic valves operated either by the passage of the power loader along the face or by remote control from a position in the gate road and trials are, in fact, being carried out. There are obvious difficulties in combining completely automatic support advancement with the presence of men on the face for any purpose and this development may be contingent on the remotely controlled loader.

Rapidly advancing faces given further roof control problems with respect to stables and gates and preliminary experiments have already been conducted with power-advanced roadhead supports. Waste support is also important in terms of rapid face advance and caving is undoubtedly the most attractive method. It is of interest to note how the use of caving has increased nationally, from 19 per cent. in 1954 to 28.1 per cent. in 1959. The ultimate aim must be to develop support systems that will enable a wider application of caving except where conditions other than strata control (gas emission, ventilation, subsidence, etc.) preclude it.

In the event of geological disturbances, the longer the face the lower is the number of times that the machine has to pass through the disturbed area, and the smaller is the loss in output which is likely to result.

Labour costs tend to decrease with increasing face length, with the exception that the labour costs incurred in roadhead operations increase sharply as soon as the face is long enough to require a third road. On the other hand, the longer the face, the greater is the quantity of equipment required, and the higher is the depreciation cost per ton of output. This increase in depreciation costs may, in fact, approach or even outweigh any gains made in labour costs by increasing the length of face.

The best length of face therefore depends upon local circumstances, but it is thought that in general terms single-unit faces, with two gates, 250 to 300 yd. long, would prove to be the most economic.

Examples of Face Concentration

Among the most outstanding results achieved in face concentration are those in No. 5 Area, North-Eastern Division.

Some performance details for one Anderton shearer face at a colliery in this Area are shown in Table 5. The seam thickness is 3 ft., the length of the face is 238 yd., and the number of machine shifts worked per week is 15.

TABLE 5.—*Results Achieved in Area 5, North-Eastern Division.*

Week ended	Pithead tons.	Average advance per day.	Face m.s.t.
16.7.60	6,773	16 ft. 9½ in.	52
23.7.60	7,140	17 ft. 5 in.	50
30.7.60	7,362	17 ft. 8½ in.	49

The manpower used includes all men employed on the face and the labour used on the roadheads.

Powered supports are used and the wastes are fully caved. The face ripping from the two gates is carried out on three shifts per day, at the same time as coal production, and the material is hand-packed. The depth of cut is 2 ft. 3 in. Great importance is attached to regular inspection and maintenance of the equipment. A spare machine is kept in the tailgate, within 50 yd. of the face and machines are replaced for overhaul after 80,000 yd. of cutting. All necessary materials are kept at the roadhead. A 75-h.p. machine is used.

Another example is an Anderton shearer face at a colliery in No. 3 Area, East Midlands Division. The principal performance details of this installation, for the first quarter of 1960, are shown in Table 6. The seam thickness is 4 ft. 4 in., the length of the face is 197 yd. and the number of machine shifts worked per week is 10.

TABLE 6.—*Results Achieved in Area 3, East Midlands Division.*

Total pithead tonnage during quarter	Average tonnage per 24 hr.	Average tonnage per machine shift	Average advance per day	Average face m.s.t.
65,221	965	465	11 ft. 2 in.	91

The manpower used includes all men employed on the face, including the ripping teams. Strip packing is employed, and the packing operation and the ripping of the gates take place at the same time as coal production on the day and afternoon shifts. All the packs are built by orthodox hand methods. The face is supported by hydraulic props and 1-m. link bars, these being staggered at 2-ft. intervals. All necessary materials are transported to the roadheads by a district team.

These two installations show what can be done when both management and men are determined to produce the last ounce of output from particular faces, and when the organization is such that high outputs can be transported. Important points are that both faces were ordinary longwall advancing units, using no equipment which is not generally available, and employing normal methods for advancing the stable holes and roadheads.

An excellent example of concentration applied to the whole operations of a colliery but without complete major reconstruction is afforded by Newstead Colliery in No. 4 Area, East Midlands Division. Table 7 shows the changes that have taken place between 1947, the year of nationalization, and 1959.

TABLE 7.—*Results Achieved at Newstead Colliery, East Midlands Division.*

	1947.	1957.	1959.
Saleable output (1,000 tons)	469	967	1,035
No. of men on books (year end)	1,298	1,282	1,268
Productivity (m.s.t.):			
Face	215	131	109
Total underground	493	250	216
Surface	197	77	62
All employed	690	327	278

This colliery has two shafts only, each 13 ft. dia. and 499 and 473 yd. deep, respectively. During this period the Top Hard Seam, which had been worked continuously for 72 years and from which all the output was won in 1947, was replaced by the High Main Seam.

Since 1947 new face techniques were introduced at the colliery with a resultant increase in output of some 500,000 ton/annum. Power loading with four Anderton shearer loaders and two trepanner installations is now operated on six out of the seven faces.

Major expenditure on face installations from 1947 to 1957 amounted to some £95,000, with a further £160,000 on drivages and main road transport for trunk belt conveyor installations during the intervening years.

The expenditure was mainly for construction work on part of the major scheme, the remainder of the underground works, including a 200-ton capacity bunker and a new pit bottom with 3½-ton capacity mine cars, being commissioned in 1958.

The new pit-bottom circuit is manned by only three men per shift, one at the loading station, one controlling traffic, and one onsetter. Two men only, the banksman and the tippler attendant, control cars on the new pit-top circuit, which was commissioned at the same time as the underground circuit.

During 1959 and 1960 the following works were carried out:—(1) The construction of a concrete headframe at No. 1 shaft; (2) erection of No. 2 winder house and the installation of No. 2 winder; (3) construction of the twin-fan house and erection of the fans; (4) construction of the "fulls" weigh house.

Further expenditure of approximately £1,000,000, is now in hand for No. 1 winder house and electric winder, new coal-preparation plant, sidings modification, and new surface buildings.

Telescopic Roadhead Supports

TO combat the occurrence of accidents at roadheads due to falls from the face of the ripping lip, Mr. G. Ratcliffe, a safety engineer at Calverton Colliery in the East Midlands Division of the National Coal Board, has devised a telescopic roadhead support which can be used at roadheads on either conventional or mechanical faces. The support, which is constructed of mild steel, consists of two parts. The upper member is 4 in. square and 3 ft. 4 in. long, and is attached to the horsehead supports by means of a specially shaped box, or collar, through the medium of a steel wedge.

The medium of securing the upper member to the collar is by a 6-in. by 1-in. steel bolt. The lower member is 3 in. square and 3 ft. 8 in. long, and is attached to the underlip support in the same manner as the upper member is attached to the horsehead support. The lower member slides, or telescopes, in the upper member according to the thickness of the ripping face.

The whole assembly is easily erected and can be safely withdrawn. It has sufficient lateral movement to meet the setting of the underlip supports.

Practical Trials with

HIGH ALUMINA REFRACTORIES

in a Cowper Stove at Workington

by J. Y. LANCASTER, A.R.T.C., A.I.M.

(Workington Iron & Steel Company)

BLAST temperatures over the last few years have been rising steadily and it must be anticipated within the next decade that blast-furnace operators will be requiring still higher temperatures in their effort to obtain bigger outputs.

While there have been great advances in burden preparation and such refinements as steam and oxygen additions to the blast, there is now an increased urgency to improve stove design and performance by, among other things, the use of better quality refractories.

Total stove rebuilds are infrequent, so that, in the main, improvements in the efficiency of stove performance have to be bought about in existing plant. An obvious line of improvement in these circumstances is to try to eliminate the off periods made necessary by minor repairs needed on the top of the checker settings and combustion chamber.

Description of Stove Plant at Workington

At the Workington Iron & Steel Company, a branch of the United Steel Companies, Limited, there are 10 Cowper stoves serving three blast furnaces. Five of these stoves are lined with a fluted type tile, three with the conventional Brassert-type checker, and two with the McKee-type installation. Hematite iron is made in the two largest furnaces and ferro-manganese or spiegel in the smallest.

Up to 1958, the linings and fillings of all the stoves were a 39/40 per cent. alumina firebrick. In that year, small experimental trials took place with different brands and qualities of higher alumina refractories. The results were so encouraging that in August, 1958, large-scale trials were undertaken in No. 7 stove, which was in service for 16 months before being taken out of commission for examination purposes.

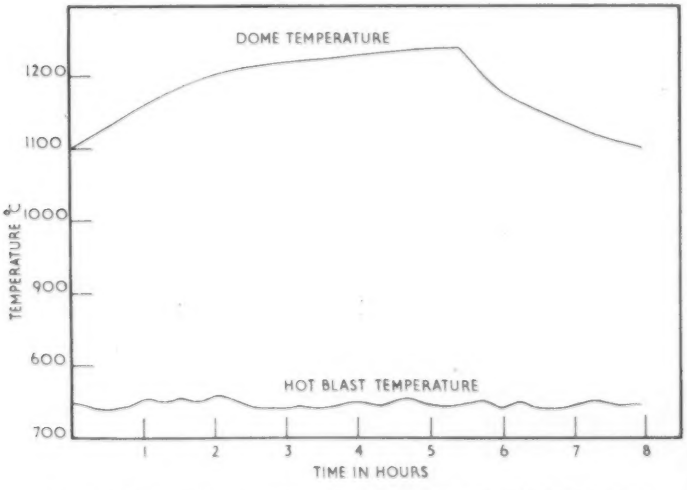


FIG. 1.—TYPICAL HEATING AND COOLING CYCLE WITH CORRESPONDING HOT-BLAST TEMPERATURE.

Details of No. 7 Stove

The No. 7 stove was first commissioned in 1941. It is 99 ft. high, with a 24-ft. dia. shell.

The combustion chamber is circular and has an area of 31.47 sq. ft.

A thermocouple is set in the dome centre to control the maximum dome temperature at 1,250 deg. C.

Blast temperatures of 840 deg. C. are frequent. A typical heating and cooling cycle is shown in Fig. 1.

In conjunction with the small

experimental practical trials and the usual conventional chemical and physical analyses being carried out at Workington, the refractories department of the research and development department of the United Steel Companies at Rotherham completed a series of bend tests, which are reported in graphical form in Fig. 2.

These tests are based on the cantilever creep tests for steels. Essentially, a specimen of ½ in. square section is inserted in a holder of fused alumina and a weight, also of fused alumina, is fitted over the end of the specimen. The maximum stress applied is 60 lb./sq. in. Tests are then carried out by raising the temperature to 1,250 deg. C. at 5 deg. C. per min., thereafter maintaining the temperature for up to 3½ hr.

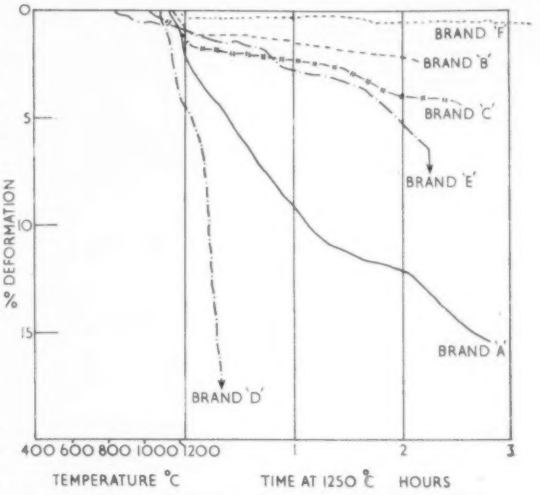


FIG. 2.—DEFORMATION CURVES FOR HIGH ALUMINA STOVE CHECKER BRICKS.

Chemical Analysis and Properties of Brassert Checkers Before and After Service

The analyses and properties are given in Table 1. Brand A is the ordinary 39/40 per cent. alumina firebrick. Brands B, C, D, and G were manufactured from fireclays enriched with alumina in the form of bauxite, while E and F were based on naturally-high alumina materials.

Details of Trial

Twenty feet of the top checkers, which had slumped and vitrified after being in service for five years, were renewed to within four courses of the top with an ordinary 39/40 per cent. alumina Brassert-type checker. Trial panels of the various types of high alumina checkers were arranged in a random distribution from east to west across the top of the checker setting so that each different type was subjected to similar conditions. In addition to the checker trial a 4½-in. soldier wall in 43 per cent. alumina firebrick was built into the combustion chamber for a height of 50 ft.

Adjacent panels of brands E and G were built into the extreme top of the combustion chamber buttress, and panels of A and E were compared in the outer shell wall (Fig. 3).

The working face of the combustion chamber was coated with a sillimanite wash.

Details of Examination

This experimental stove was taken off for examination after 16 months' service. The condition of the refractories was very good. The high alumina checkers with one exception were all distinctly better than the firebrick, which had vitrified and shrunk. Examination showed the following results:—

(1) The two naturally-high alumina materials, brands E (Fig. 4) and F, were as good as the day they went into service. No volume changes had

FIG. 3.—PHOTOGRAPH SHOWING PANELS OF E AND A IN THE STOVE WALLS. SHRINKAGE OF JOINTS AND RUNNING OF THE SURFACES CAN BE SEEN ON THE ORDINARY FIREBRICK A.

TABLE 1.—*Chemical Analysis and Properties of Brassert Checkers Before and After Service.*

	Brand of Brassert checker.	Apparent porosity, per cent.	Bulk density, g/cc	A.S.D.	SiO_2, per cent.	Al_2O_3, per cent.	TiO_2, per cent.	Fe_2O_3, per cent.	CaO, per cent.	MgO, per cent.	K_2O, per cent.	Na_2O, per cent.
A	Before use	22.2	1.88	2.50	51.90	38.97	0.87	2.40	0.60	0.83	1.59	0.61
	After use—Skin	—	—	—	—	—	—	—	—	—	13.32	0.69
	Centre	8.84	2.23	2.48	—	—	—	—	—	—	2.02	0.31
B	Before use	20.0	2.23	2.79	45.30	48.18	1.45	3.0	0.56	0.22	1.01	0.12
	After use—Skin	—	—	—	—	—	—	—	—	—	7.92	0.42
	Centre	23.31	2.25	2.93	—	—	—	—	—	—	1.51	0.20
C	Before use	22.61	2.14	2.76	21.8	49.95	2.12	4.43	0.50	0.1	0.80	0.19
	After use—Skin	—	—	—	—	—	—	—	—	—	10.92	0.63
	Centre	14.25	2.41	2.81	—	—	—	—	—	—	1.30	0.26
D	Before use	31.57	1.94	2.83	29.88	53.22	1.60	3.85	0.48	0.10	0.74	0.09
	After use—Skin	—	—	—	—	—	—	—	—	—	8.52	0.52
	Centre	32.99	1.91	2.85	—	—	—	—	—	—	0.96	0.20
E	Before use	23.05	2.29	2.95	37.72	55.7	2.23	3.43	0.42	0.14	0.43	0.19
	After use—Skin	—	—	—	—	—	—	—	—	—	6.36	0.42
	Centre	20.07	2.27	2.84	—	—	—	—	—	—	0.46	0.15
F	Before use	22.65	2.40	3.17	36.48	57.40	2.18	1.85	0.45	0.07	0.90	0.61
	After use—Skin	—	—	—	—	—	—	—	—	—	5.52	0.83
	Centre	20.63	2.41	3.04	—	—	—	—	—	—	0.64	0.18
G		22.00	2.09	2.68	39.1	51.00	—	—	—	—	—	—

taken place and they had the smallest alkali pick-up.

(2) Of the synthetic clay/bauxite brands the best results were obtained with the lowest porosity material, brand B (see Fig. 5).

(3) The results obtained in the trial bore a close correlation with the bend-test results obtained in the laboratory. Broadly, the two sets of results can be compared as shown in Table 2.

TABLE 2.—*Results of Laboratory Bend Tests.*

	Results of laboratory bend tests. Order of merit.	Practical stove trials. Order of merit.
(1)	Brand F	Brand F
(2)	Brand B	Brand E
(3)	Brand C	Brand B
(4)	Brand E	Brand C
(5)	Brand A	Brand A
(6)	Brand D	Brand D

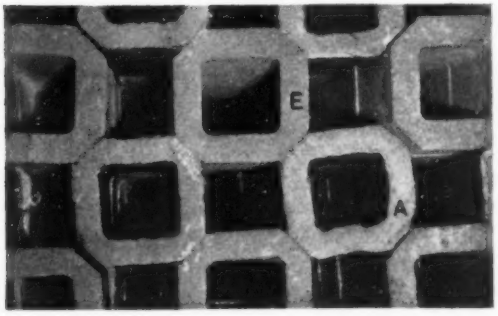


FIG. 4.—PHOTOGRAPH SHOWING THE DEFORMATION OF AN ORDINARY FIREBRICK A. IMMEDIATELY ABOVE, CHECKERS OF BRAND E BRICK CAN BE SEEN TO BE STILL IN PERFECT SHAPE.

The bend test indicated that the synthetic clay/bauxite, brand D, was physically weak before it went into service. This was borne out in the trial by the cracking of every individual checker.

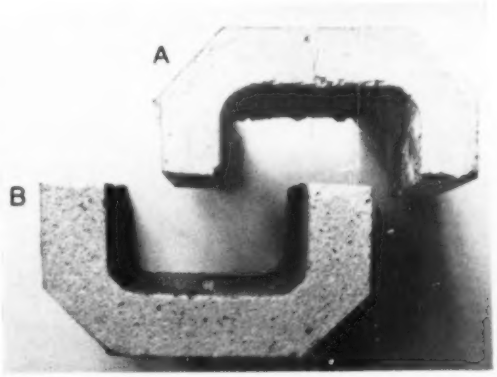


FIG. 5.—CLOSE-UP OF SECTIONS OF BRANDS A AND B. SIGNS OF VITRIFICATION CAN BE SEEN IN THE UPPER CHECKER A OF ORDINARY FIREBRICK, WHILE IN THE LOWER SYNTHETIC CLAY BAUXITE BRICK B THE OPEN TEXTURE IS STILL EVIDENT.

(4) The 43 per cent. alumina brick in the soldier wall of the combustion chamber coated with sillimanite was in excellent condition.

(5) The 39 per cent. Al_2O_3 firebricks in the upper part of the combustion chamber showed signs of shrinkage.

(6) The direct comparison between the ordinary firebrick and the naturally-high alumina material in the stove walls above the checker level was startling.

Pronounced evidence of shrinkage and wide joints and liquid services were observed with the firebrick whereas the high alumina material was quite unmarked (Fig. 3).

(7) The difference between the two high alumina qualities, E (natural) and G (synthetic), in the top of the combustion chamber buttress was not very

FIG. 6.—GENERAL VIEW OF THE TOP OF THE CHECKER SETTING AFTER 16 MONTHS' SERVICE.

pronounced, although G appeared slightly superior, which could be attributed to a finer structural texture. Both brands were markedly superior to normal firebrick in the adjacent stove wall.

Conclusions

These first trials with different qualities of high alumina refractories in a blast-furnace stove show that they offer an advance over ordinary firebrick quality. The best performances were obtained from refractories made from materials naturally high in alumina. Among the synthetic clay/bauxite materials the quality with the lowest porosity gave the best results.

Sometimes it is difficult to find close correlation between test properties of refractories determined in the laboratory with performance in plant trials. However, in this trial the correlation between hot-bend test results and plant performance is quite close.

It is early to evaluate the benefits in coke and production rates resulting from the higher blast temperatures that are permitted by these special refractories. However, it is already clear that these refractories are markedly superior to ordinary firebrick. Only when a blast furnace is working wholly on stoves lined with better refractories will the full economics be realized.

It is appreciated that with many existing blast-furnace stoves it may be difficult to improve their performance by alteration in design, but it would appear that by using superior refractories in locations such as, say, the upper part of the stove, higher blast temperatures may nevertheless be attainable.

Correspondence

SIEMENS'S REGENERATIVE GAS FURNACE

To the Editor of IRON AND COAL

SIR,—Mr. Schofield's article, in your issue of January 20, on "The Regenerative Gas Furnace of Siemens" is full of interest to metallurgists, but in this careful study of the origin and development of regenerative firing two small points have been overlooked.

The first is that it was actually Carl Wilhelm Siemens's brother Friedrich who suggested the application of thermal regeneration to furnaces. The first patent No. 2,861, of 1856, is in the name of Friedrich and is for the recovery of heat from the waste gases of furnaces burning solid or gaseous fuels. In the paper which C. W. Siemens read to the Institution of Mechanical Engineers on June 24, 1857, he freely acknowledged this debt to his brother. Friedrich was a man of equal capacity to his brother and was the founder of a firm which builds open-hearth furnaces to this day—Friedrich Siemens G.m.b.H., of Düsseldorf and Berlin.

The second point of comment in Mr. Schofield's description of Pierre and Emile Martin as brothers; they were, in fact, father and son, Pierre Blaise Emile Martin (1824-1915) being the son of Emile, the owner, at the time of the experiments, of the Sireuil ironworks.

The success of the Martin process—the decarburization of pig-iron with wrought-iron scrap in the open-hearth furnace, combined with Siemens's regenerative firing—led to attacks on his patent, on the grounds that it was merely a combination of known processes. Others, therefore, reaped the benefit, and Pierre Martin gave up the struggle and retired into a rather penurious private life. In 1909, a fund was set up to relieve his distress, to which many who had profited by the Martin process carried out in the Siemens furnace contributed. The Comité des Forges gave £4,000, and a special fund was raised in this country. The Iron and Steel Institute awarded him the Bessemer Gold Medal in 1915, though he died a few days before he was to have received it.

His contribution to steelmaking is, nonetheless, forever embodied—in a rather curious way—in the language of our French steelmaking colleagues; to them, an open-hearth furnace is a "four Martin."—Yours faithfully,

J. P. SAVILLE,
Information Officer.

Iron and Steel Institute,
4, Grosvenor Gardens,
London, S.W.1.
February 2, 1961.

Cambridge Instrument's Expansion

Work is now well advanced on another large building at the factory of the Cambridge Instrument Company, Limited, in Chesterton Road, Cambridge. The new building, which will be joined to the new research laboratories, will house the testing, assembly, and wiring departments, on the top floor, while the first floor will be devoted to enlarged production space for the company's Microscan X-ray analyser and to works offices. The area beneath the first floor will be almost wholly taken up by parking space and a loading bay with gantry and platform. A double-decker bridge will connect the building to existing production departments and provide additional space for a calibration room and cloakrooms. The building is expected to be ready for occupation in July.

Special Steels

for ENGINEERING PURPOSES

British Experiences with Low- and High-alloy Steels

by K. C. BARRACLOUGH and P. JUBB

(*Firth-Brown Research Laboratories*)

This is a translation of an article contributed to the special "Eisenhüttentag 1960*" supplement of the Deutsche Zeitung of November* 3, 1960, *issued on the occasion of the* 100*th anniversary of the German Iron and Steel Institute.*

DURING the past year there has been a considerable stimulation of interest in vacuum processing for alloy steels. One of the major manufacturers of forgings is installing vacuum degassing equipment, and no doubt others will follow, if only to cope with the hydrogen problems which will surely arise as a result of the trend to replace open-hearth plant with electric furnaces. So far, most of the output of vacuum remelting, as distinct from vacuum casting, has come from spare facilities for remelting titanium, but these have now proved inadequate and several consumable arc furnaces are being installed specifically for steel. This is largely a consequence of aircraft designers having decided to use vacuum remelted steel for the discs in their newer engines, but interest has also been shown in vacuum steel for high-temperature and heavy-duty bearings for cold work rolls and for highly polished press plates for plastic manufacture.

Continuous Casting of Alloy Steel

There is increased interest, too, in the continuous casting of alloy steel. This seems to centre round the possibility of producing bar or billet suitable for machining or dropforging from continuous cast blooms, either by extrusion or in a secondary mill, without recourse to a cogging mill. The important question is whether the quality of the product will be adequate for engineering alloy steels. Investigations into the quality of stainless steel sheet from continuous slab are also being undertaken.

Nuclear engineering continues to provide its own special problems. Restrictions on cobalt and tantalum, particularly in stabilized 18/8 stainless steel, are calling for special selection of raw materials; it is of interest that low cobalt iron appears to be available only from Scandinavian sources. Stainless steel canning materials call not only for melting from these specially pure materials, but also subsequent vacuum refinement: this must be one of the most expensive steels yet produced, but only thus can the necessary combination of purity and ductility be obtained.

There are problems, too, arising from the advances which continue to be made in the generation of electricity in conventional thermal stations. The trend to generate power in very large units has led to a demand for fewer but larger and more highly stressed forgings than formerly. In this connection the metallurgical problems are bad enough, but there are difficult economic questions also. The risk of rejection as a result of internal defects is increased because of the larger size and there are difficulties in keeping the necessary large and specialized plant fully occupied because fewer forgings are required.

Higher operating temperatures in steam turbines have led to a demand for steels with better creep resistance and better welding characteristics than the 18/12 Nb stainless steel so far used. The inclusion of molybdenum appears to be helpful in both respects, but more highly alloyed materials will probably be required for stations now under consideration.

Larger turbine blades also call for higher tensile materials with good ductility and fatigue properties. A modified 12 per cent. chromium-molybdenum-vanadium-niobium type steel has enabled these requirements to be met in the main. Although this addition has impaired creep characteristics to some extent, there is a notable gain in impact strength at the 60-65 ton/sq. in. tensile level.

One of the most interesting recent developments, however, is a precipitation hardening martensitic steel which is basically 14 per cent. chromium and 5 per cent. nickel, with molybdenum to improve corrosion resistance and copper as a precipitation hardening agent. By varying the ageing temperature over the range 450 to 620 deg. C., tensile strengths of 90 to 60 ton/sq. in. can be obtained.

In the fully over-aged (620 deg. C.) condition the ratio of fatigue to tensile strength of this steel is almost 0.70 with Izod values of the order of 90 ft.-lb. Corrosion resistance, moreover, under

most conditions is the equivalent of 18/8, and except in the hardest conditions the steel is very resistant to stress corrosion. Weldability is also good. This steel is accordingly replacing the more conventional hard stainless steels, for impellers, pump parts, gears, wearing surfaces, and turbine blades. A somewhat similar composition is available as sheet, which can be obtained in an austenitic condition by rapid cooling from 1,050 deg. C. and after forming can be hardened to 60-80 ton/sq. in. by a suitable ageing treatment.

Two weldable ferritic stainless steels have also become available. One is an extremely low carbon 12 per cent. chromium steel with a balanced alloy content to give low peak hardening characteristics. The other and more interesting material, is a 20 per cent. chromium molybdenum steel. It is resistant to grain growth (the usual bugbear of high chromium ferrite) and welded joints with good ductility can be made. Corrosion resistance is good and stress corrosion resistance is excellent. This steel should find acceptance for certain applications which have so far created real problems.

Formation of Corrosion Institute Suggested

FORMATION of an institute of corrosion and the classification of workers in the corrosion field into research workers, specialists, and general practitioners on the lines of the medical profession, were two suggestions made by Mr. C. L. Wilson at the second annual dinner of the British Association of Corrosion Engineers in London on January 26. Mr. Wilson said that corrosion was a disease of industry and should be attacked as the medical profession attacks disease. The corrosion engineer, he said, was the G.P. of the profession. To find the answer to any problem he must have the backing of specialists and research workers.

The institute of corrosion was his own private idea, said Mr. Wilson. He thought that the three bodies concerned, the Corrosion Science Group led by Dr. T. P. Hoar, head of the Department of Metallurgy at Cambridge University, the corrosion group of the SCI, and BACE, should form a body to correlate work and disseminate information. At the moment, he said, there was no way of getting information without contacting someone who had an axe to grind.

ARMSTRONG WHITWORTH AT LEIPZIG

SUPPLIERS of rolls to the German Democratic Republic for a number of years, Armstrong Whitworth (Metal Industries), Limited, Gateshead-on-Tyne, is again exhibiting at the Leipzig Spring Fair (March 5 to 14). Photographs to show the company's production resources will be displayed, and Mr. T. A. Bird, manager of roll sales, will be in attendance on the stand.

During the past six years, the value of Armstrong Whitworth's roll exports to the GDR has totalled approximately £100,000.

Condensation of Superheated Steam

CONDENSATION of superheated steam will be the subject of a conference to be held on March 14 and 15 at the National Engineering Laboratory, East Kilbride. For many years, engineers have argued about the effect of superheat on heat transfer from condensing steam. Some assert that superheat has a bad effect, and install desuperheaters in process plant. But others are unable to understand how such an effect can arise. When steam is used at higher pressures for power generation, it is now common practice to heat the boiler feedwater with steam bled from the turbines. Such steam may be superheated enough to make it possible to heat the feedwater above the saturation temperature of the steam. Although feedheaters are now being designed for such " negative terminal temperature difference " operation, many designers admit to feeling their way; authoritative design data are lacking.

The National Engineering Laboratory is working on the feedheater problem, and is considering extending this work into the process field. The conference at the laboratory will thus serve both to make clear the existing state of knowledge in this controversial field and to ensure that the work at the NEL will embrace those aspects of the problem of most interest to industry. Much of the time will, it is hoped, be occupied by informal discussion, but a few papers will be presented to stimulate discussion. These include a survey of the existing state of knowledge as shown in published work, presented by the NEL, papers by Mr. J. L. Gray, of the Central Electricity Generating Board, and Dr. R. S. Silver and Dr. H. Simpson, of G. & J. Weir, Limited, and two short papers by the NEL describing the experimental feedheater rig which is now being assembled, and a method of using a digital computer for designing feedheaters.

It is emphasized that, although much of the material discussed will inevitably be theoretical, the ultimate objectives are strictly practical. It is hoped that the conference will attract engineers and others concerned with problems and developments in this important subject.

The conference will start at 11 a.m. on the first day, for the benefit of people travelling from England by air, and the formal sessions will end at lunchtime on the second day. Opportunities will be provided for those attending the conference to visit the heat and other laboratories at the NEL. Further information about the conference may be had from the Director (Heat Division), National Engineering Laboratory, East Kilbride, Glasgow.

POLAND'S COAL OUTPUT this year is expected to reach 105,500,000 tons. This official assessment is based on an average daily output of 1.2 tons per miner.

Oxygen Supplies for US Steel Industry

CONSUMPTION INCREASES IN SPITE OF DEPRESSION

GROWTH of what are described as on-site high-purity oxygen plants in the United States is rapidly expanding, according to an article published in Steel (November 21, 1960). Total annual production of oxygen increased from 22.1 billions* cu. ft. in 1954 to 44.9 billions in 1959. One reason, of course, is the greater demand for oxygen by the steel industry, encouraged by the advantages of oxygen supplies on site. Most of the principal suppliers expected sales in 1960 to exceed those in 1959.

A recent report from one supplier, however, mentioned a lag of 12 per cent. Fortunately, a reduction in steel output does not materially affect oxygen sales because practice among companies employing it is to withdraw the least efficient furnaces from production and to operate only those using oxygen. In July last, when the national steel output fell to 50 per cent. of rated capacity, oxygen converters continued to operate at above 80 per cent.

Increasing Numbers of On-site Oxygen Plants

The construction of on-site plants has gained momentum during the last five years. Present practice is for the supplier to build, operate, and retain ownership of the plant, the gas being sold under long-term contract. Factors making that arrangement desirable include:—(1) Cheaper oxygen; (2) funds otherwise required for oxygen equipment can be employed elsewhere, and (3) it guarantees the user an uninterrupted supply.

The cost of oxygen has been steadily falling. The Linde concern states that the figure appropriate for a 270-ton plant has been reduced from about $14 to $12 per ton over the past 10 years. When Air Products Inc., Allentown, Pa., built the 500-ton-a-day installation for Weirton Steel it was able to produce oxygen for 3 cents per 100 cu. ft., compared with 30 to 35 cents per 100 cu. ft. for hauling bulk liquid oxygen. Today, on-site plants can deliver the gas for around 5 cents per 100 cu. ft., although costs have gone up.

The present daily capacity of Air Products for the steel and metalworking industries is about 1,700 tons, planned increases being to 3,800 tons a day by 1961, 6,300 tons a day by 1965, and 10,000 tons a day by 1970. Linde reports its daily national capacity to date as 3,623 tons, and expects to reach daily production of 6,228 tons by 1962. Air Reduction Company, Inc., New York, has a daily capacity of 1,500 tons, more than one-third being devoted to steel production. It is building a 120-ton-a-day plant for the Tennessee Coal & Iron Division, US Steel Corporation, Fairfield, Ala., and is negotiating to build a 675-ton/day plant for the Bethlehem Steel Company at Johnstown, Pa. Planned to be started in 1961 are six to eight additional plants with capacities between 200 and 400 tons a day.

The following percentages show how oxygen is used in some 60 American steelworks:—Blast furnace, 1; open-hearth roof jets, 25; open-hearth decarburization, 13; open-hearth combustion oxygen, 15; miscellaneous metallurgical, 8; hand scarfing, 14; machine scarfing, 13; scrap separation, 5; construction and maintenance, 6.

* USA billion = 1,000 millions. British billion = 1,000,000 million.

User Experience of Industrial Vacuum Plant

FOLLOWING a recommendation by the Joint British Committee for Vacuum Science and Technology, the council of the Institution of Mechanical Engineers has agreed to sponsor a symposium of papers on user experience of large-scale industrial vacuum plant, to be held at the institution on March 1 and 2, 1961. The main objective of the symposium is to bring together designers and users of vacuum plant to discuss their problems and techniques. It is felt that designers and manufacturers will benefit from the opportunity to learn about users' experience with such plant, and that users will welcome an opportunity to place their experience on record.

Arrangements for the symposium are being made by a committee consisting of representatives drawn from constituent bodies of the Joint British Committee. It is planned to discuss about a dozen papers, which will be preceded by a general review paper. The latter will be given at 4 p.m. on the opening day and will be followed by a group of papers on vacuum processing and treatment of metals. On the morning of the second day there will be further papers on metallurgical subjects, together with a contribution on steam ejection vacuum plant and a paper on capacitor drying. The afternoon session will be devoted to papers covering medical and food processing aspects.

Registration will be required; application should be made to the secretary of the institution at 1, Birdcage Walk, Westminster, London, S.W.1.

New Patents

PATENTS below are among the complete specifications accepted listed in the Official Journal (Patents). The numbers given are those under which the specifications have been printed and all subsequent proceedings will be taken.

Applications for copies of the full specifications (3s. 6d. each, post free) should be made to the Patent Office, 25, Southampton Buildings, Chancery Lane, London, W.C.2.

Mining and Mining Appliances

853,206 BERGBAUSTAHL G.m.b.H. Anchor means for mine supporting structures.

853,041 EGGEMANN, W., and CAMPENHAUSEN, VON E. [trading as SCHWARZ KOMM. GES., H.]. Support elements for mine supporting systems.

852,992 MASTABAR MINING EQUIPMENT COMPANY, LIMITED, TEBB, B., and TEBB, E. Joining of conveyor, power transmission, or the like belts.

853,272 HAYDEN-NILOS, LIMITED. Infusion equipment for shotfiring.

853,273 HAYDEN-NILOS, LIMITED. Infusion equipment for shotfiring.

853,152 WOLF SAFETY LAMP COMPANY (WM. MAURICE), LIMITED. Safety lamps.

853,281 BEYER, R. Telescopic pitprop.

853,921 MITCHELL, N. S. Roof supports for use in mines and similar places.

853,410 GUTEHOFFNUNGSHÜTTE STERKRADE A.G. Hydraulic pitprops.

853,868 BOCHUMER GESELLSCHAFT FÜR GRUBENAUSBAU UND TECHNIK. Apparatus for removing the side segments of mine gallery prop frames.

853,822 HEMSCHEIDT, H. [trading as HEMSCHEIDT MASCHINENFABRIK, H.]. Roof supporting frame for use in mines.

Metallurgy and Engineering

852,905 BRITISH IRON AND STEEL RESEARCH ASSOCIATION. Processing metal in elongate form.

853,283 INSTITUT DE RECHERCHES DE LA SIDERURGIE, and SOC. GRENOBLOISE D'ETUDES ET D'APPLICATIONS HYDRAULIQUES. Hearth furnaces heated by a flame.

853,124 UNITED STEEL COMPANIES, LIMITED. Steels.

852,748 IMPERIAL CHEMICAL INDUSTRIES, LIMITED. Backed-up rolling mills.

853,210 BRITISH IRON AND STEEL RESEARCH ASSOCIATION. Extrusion.

853,214 FISHER & LUDLOW, LIMITED. Endless chain conveyors.

853,468 JESSOP & SONS, LIMITED, W. Nickel-chromium-cobalt alloys.

853,574 MINING ENGINEERING COMPANY, LIMITED. Internally screw-threaded tube.

853,490 IMPERIAL CHEMICAL INDUSTRIES, LIMITED. Continuous casting of metals.

853,484 UNITED STATES STEEL CORPORATION. Method and apparatus for indicating and controlling the rate of heating of a travelling strip.

853,411 BOCHUMER VEREIN FÜR GUSSTAHLFABRIKATION A.G. Manufacture of steel.

853,493 CARPENTER STEEL COMPANY. Alloy steel for use at high temperatures.

853,383 FOUNDRY SERVICES, LIMITED. Semi-continuous casting of metals.

853,385 SEVERIN, A. A. Method of operating a gas generating shaft furnace as a gas generator, blast furnace, or cupola, and a furnace for carrying out the method.

853,680 PINTSCH BAMAG A.G. Waste-gas hood arrangements for rotatable metallurgical converters.

853,740 MASTERS & SONS (PARK FOUNDRY), COMPANY, LIMITED, T. Ingot-casting machines.

853,392 UNION CARBIDE CORPORATION. Removal of slag and waste products from thermo-chemically desurfaced metal slabs.

853,854 AMERICAN SMELTING & REFINING COMPANY. Continuous casting apparatus and method.

853,855 AMERICAN SMELTING & REFINING COMPANY. Mould for continuously casting metals.

Fuel Treatment and Utilization

852,852 SIMON-CARVES, LIMITED. Horizontal coke ovens.

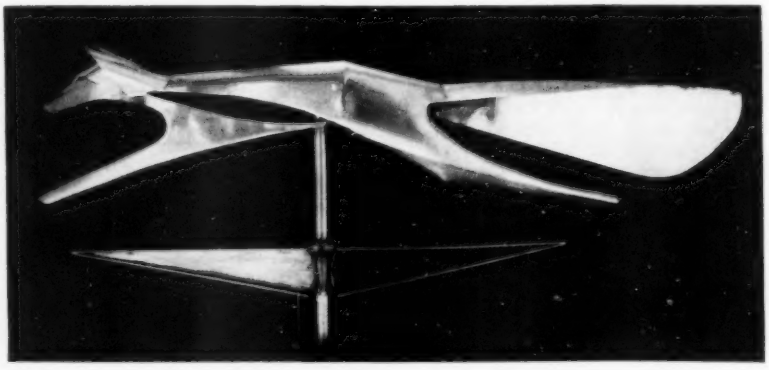
854,267 STEINMÜLLER G.m.b.H., L. & C. Process for the degasification of fuel dust.

854,412 VERKAUFSVEREINIGUNG FÜR TEERERZEUGNISSE, VFT A.G. Method for the production of a high-grade coke intended for metallurgical purposes.

Stainless Steel Weathervane at Samuel Fox

MOUNTED on the roof of the umbrella building at the Stocksbridge, near Sheffield, works of Samuel Fox & Company, Limited, this striking weathervane is made of Silver Fox 316 quality stainless steel.

The weathervane was designed by Stocksbridge-born Mr. Trevor Faulkner, ARCA, who is one of the country's leading exponents of modern metal sculpture.



EXPLOSION OF COAL DUST IN WET CONDITIONS

Report of Bryan Committee's Working Party

Concerned with the problems attending the explosion hazard of coal dust in wet conditions, a Working Party of experts was appointed in November, 1959, and has now submitted its report and recommendations. The Working Party was appointed following the recommendation of the Sub-committee on Mining Explosions set up by the Safety and Health Committee of the Coal Industry National Consultative Council under the chairmanship of Sir Andrew Bryan.

CONSIDERATION has been given to the researches carried out during recent years at the Polish Research Station for Mine Safety by Dr. W. B. Cybulski into the explosion of wetted coal dust, and their implications in British mining practice. The report also discusses the explosion hazard arising from the deposition and accumulation of coal dust, not fully wetted, in damp and wet conditions.

The Working Party expresses the opinion that the latter hazard, exemplified by two explosions referred to in the Bryan Report, constitutes a more serious risk in British mining conditions than does that of the coal dust "mud" specifically studied by Dr. Cybulski. Important though these hazards have been shown to be, it is considered that the principal danger from coal dust explosion remains in dry conditions.

The Polish experiments were made in a straight tunnel, a little over 50 sq. ft. in cross-sectional area, and approximately 220 yd. long, having one closed end and one open end. The igniting source for the initiating explosions in all the experiments was the firing of 1½ lb. of black powder from an unstemmed shothole situated at the closed end of the tunnel. The mildest of the initiating explosions used was obtained simply by placing 4 lb. of the coal dust under test on a board at the mouth of the shothole.

Increases in the violence of the initiating explosion were obtained by spreading fine, dry, pure coal dust for distances along the tunnel from the shothole, of approximately 13 ft., 50 ft., and 100 ft.

One other initiating explosion used was the firing of the 1½ lb. of black powder from an unstemmed shothole direct into an explosive atmosphere containing 8 to 9.5 per cent. firedamp which stretched for a little over 30 ft. along the tunnel from the closed end.

The coal dust containing the proportion of water and/or stone dust in intimate mixture, which formed the subject of the experiment, was then spread on the roof bars or on the floor along a sufficient length of the tunnel to enable a reliable estimate of whether propagation or non-propagation of an explosion was obtained.

The presence of water affects the explosion hazard of a deposit containing coal dust principally in two quite distinct ways:—(*a*) As a dampening agent, by increasing the difficulty of raising the deposit into the air to take part in an explosion, and (*b*) as an incombustible material of high heat capacity, by reducing the inflammability of any part of the deposit raised in the explosion.

Dr. Cybulski has shown that an explosion started by a powerful initiator can be propagated by coal dust containing so much water as to be in the form of a mud. His tests were carried out with what he described as "dusts with considerable explosive properties." These explosions of coal dust mixed with water were extremely violent. The broad findings of the research are:—

(1) The water content necessary to safeguard the coal dust is related to the violence of the initiating explosion, being relatively low with weak initiators.

(2) For a given initiating explosion, the water

MEMBERS OF THE WORKING PARTY

Chairman: Dr. H. L. Willett (National Coal Board).

Dr. F. V. Tideswell, Mr. H. S. Eisner, and Mr. G. Hoyle (Ministry of Power).

Mr. K. H. Saunders (National Union of Mineworkers).

Dr. D. G. Skinner and Mr. E. D. Wakefield (secretary), both of the National Coal Board.

content of the coal dust necessary to prevent propagation: (*a*) increases as the fineness of the dust increases; (*b*) is greater when the dust is on the roof bars than when it is on the floor; and (*c*) decreases as the percentage of incombustible matter mixed with the coal dust is increased.

Assessment of the Hazard in British Mines

Test facilities in this country for explosions on the necessary large scale, have not been able to be made and confirmatory experiments with British coal dusts and with types of initiating explosion have not been possible. The Working Party therefore had to rely on reasoning from general experience in advising on the application of the results of the Polish research to British mining practice.

The initiating explosions used in the Polish experiments were those which Dr. Cybulski had previously used to simulate a range of sources of initiation, of varying intensity including the most violent, that could be conceived in mines. The most violent explosions initiated in dry deposits had shown themselves capable of being arrested only by very high percentages of stonedust up to 87 per cent.

Considering conditions approaching the most severe of those studied in Poland, a violent explosion can be visualized starting at the inbye end of a long coal heading either as a result of ignition of a body of explosive mixture of gas, or as a result of direct ignition of a cloud of dry, or fairly dry, coal dust raised, for example, by blasting. There is no opportunity for release of pressure in such a heading (in contradistinction to what occurs at a longwall face where there is ample opportunity for release of pressure into the waste and in both directions along the coal face and the roadways) and the conditions are thereby the most favourable for the initiation and propagation of a dust explosion. At least one violent coal dust explosion in Britain has been started in this manner.

Dr. Cybulski has shown the ignition of a large body of explosive mixture of gas in such circumstances might even produce sufficient violence to raise thoroughly wet coal dust into the air either directly or after the ignition of dry coal dust. Within the knowledge of the Working Party all the conditions conducive to such an explosion of thoroughly wet coal dust have not in the past arisen together.

All the Polish experiments were carried out with coal dust of high volatile matter content, most with one having a content of 41 per cent. (on the dry, ash-free basis). Some 9 per cent. of the output of British mines is from seams having a volatile matter content of over 40 per cent. and a further 60 per cent. is from seams of between 35 and 40 per cent. volatile matter content. It is noteworthy that Dr. Cybulski, in a few tests made with coals of such lower volatile content, found an inflammability not much lower than that of his most inflammable dust.

So far as fineness of dust is concerned, it is unlikely that the larger accumulations, such as may arise from spillage at transfer or loading points, or along conveyors, will be of dust nearly as fine as the finer dust investigated in Poland, and its inflammability would thereby be lower. Nevertheless, the likelihood must be accepted of finer, originally airborne dust being deposited on roof and sides and supports, in quantities which though smaller would still be sufficient to propagate a violent explosion; and these conditions are those most conducive to dispersion of the dust and its explosion.

There are related hazards which may be of more frequent occurrence and greater importance in British mines, which are, in general, less wet than those in Poland. They arise from the only partial wetting of coal dust. Coal dust wets with difficulty and, unless mechanically kneaded with water or treated with a coal-wetting agent, is liable to remain freely dispersable even when resting on a wet surface. Conditions under which no dry coal dust is made during coal-mining operations are uncommon.

For example, on the coal face, despite wet-cutting and water-infusion, some of the dust may escape wetting or may dry out, while during coal transport there are ample opportunities for the coal to dry out and for dust to escape and be disseminated in the roadway, either as airborne dust or by accumulation near transfer points and on and under the conveyor structure. However wet the road or humid the air, such coal dust may remain unwetted and readily dispersable for an indefinite period. Moreover, even in a very wet road, there may be sites comparatively dry where dust may lodge, dry out, and regain dispersability.

The greatest danger arises from a possible superficial covering of dispersable coal dust on apparenty wet surfaces. Such dust, deposited from the air, is likely to be very fine, certainly mainly below 60 microns in size, and, despite associated inert materials the quantity needed to propagate an explosion when dispersed into the air is small, below 0.05 oz. of coal dust/cu. ft. of air space. Such a quantity, settled on the perimeter, supports and equipment of a roadway, would form a layer only a few thousandths of an inch thick. The presence of a layer of dust of such thinness might easily be overlooked under the conditions of a "wet" mine roadway.

Lack of Uniformity

Hazards may also arise from lack of uniformity of wetness of the coal dust deposit both in the cross-section and along the roadway. If coal dusts of different degrees of wetness are present in any deposit, casual examination, or even sampling, may not disclose the full hazard, because the blast ahead of an advancing explosion will preferentially raise the drier, more dispersable, component—possibly raising only a small fraction of the available material, but sufficient to propagate an explosion.

Any deposit, whether of dust or of sludge, in mine roadways should be regarded as potentially

capable of being raised into the air by an explosion and the addition of water alone would not give full protection in the event of explosions.

In treating coal dust in wet roadways, ordinary stonedust will lose its dispersability in the wet conditions more readily than will the coal dust and, if the two dusts are insufficiently mixed, it will then contribute less to the safety of the roadway.

This disadvantage can, however, be overcome by the use of waterproofed stonedust, which retains its dispersable nature even after prolonged contact with wet surfaces or even with water itself. Such dust is readily manufactured by the incorporation during grinding of as little as $\frac{1}{8}$ or $\frac{1}{4}$ per cent. of a waterproofing agent; higher proportions are unnecessary and inadvisable. Moreover, suitably waterproofed stonedust carries an additional advantage in that it retains its dispersability even better than most coal dusts in wet conditions.

In roadways where general stonedusting is unlikely to provide sufficiently complete protection (as, for example, in conveyor roadways), stonedust barriers used in conjunction with general stonedusting provide the best known measure of protection in wet as in dry conditions. The use of waterproofed stonedust is advisable.

The Working Party recommends the spreading of an effectively waterproofed stonedust where the conditions are wet and, indeed, wherever ordinary stonedust loses its dispersability readily in lengths of road to which Part 2 of the Coal Mines (Precautions against Inflammable Dust) Regulations, 1956 applies. Untreated stonedust should continue to be used in other conditions because of its greater efficacy.

Sampling of road dusts, as at present required by statutory regulations, should include the sampling of the appropriate lengths of road where the conditions are wet or damp as well as those where the conditions are dry. The samples should be representative, so far as possible, of the more dispersable surface layer.

Stonedust barriers should be installed in conjunction with general stonedusting in wet and damp conditions, wherever they would have been required had the roads been dry. The stonedust used should be of the waterproofed type.

Important though the explosion hazard of wet coal dust has been shown to be, the principal coal dust explosion hazard remains in dry conditions and this demands further study. The Working Party, therefore, recommends the acceptance of the SMRE offer to review the 1943 special report on coal dust explosions in the light of subsequent experience and experiment.

New Diesel Locomotive for South African Mines

RECENTLY introduced at a gold mine in the Eastern Transvaal after completing the most stringent tests is a new flameproof diesel locomotive designed and built by the South African locomotive engineers, C. H. Funkey & Company (Pty.), Limited. The new unit is the first in South Africa to meet the exacting standard demanded of flameproof locomotives by the US Federal authorities.

Previously, all diesel locomotives issued with a Buxton certificate have been permitted to work in gassy sections of mines in South Africa, but now, according to an article in the December 16, 1960, issue of the South African Mining and Engineering Journal, the standard for South African mines has been raised.

Since no standard was in existence for South Africa, it was decided to adopt the more stringent requirements listed in Schedule 31 of the US Department of the Interior for mobile diesel-powered equipment for gassy non-coal mines and tunnels.

In designing the diesel locomotive one of the first steps taken was to ensure that the engine stopped running immediately it encountered a methane/air mixture after the fuel was shut off. This called for a butterfly-valve arrangement situated between the oil-bath air cleaner and the inlet manifold, which automatically excludes the ambient air whenever the engine is stopped, either manually or by one of the automatic trips.

The US specification requires that the temperature of any external surface of the engine or exhaust system shall not exceed 400 deg. F. under any condition of operation. It also requires that the water-cooled components shall have integral jackets with provision made for positive water circulation and automatically to shut off the engine when the temperature of the water exceeds 212 deg. F.

To comply with these requirements the exhaust and inlet manifolds have been combined, the inlet manifold forming the outer wall of the water jacket. This water-cooled combined manifold has been found to reduce most effectively the exhaust temperature, thereby eliminating any necessity for a complicated system of water sprays in the exhaust. A water-circulating pump, driven by the engine, circulates the water round the manifold before it flows round the engine.

Australia's Largest Iron-ore Deposit

What is claimed to be Australia's largest iron-ore deposit has been found and is being explored by the Griffin Coal Mining Company, Limited. The deposit is on the Scott river, near Augusta, 205 miles south of Perth. Exploration is reported to have disclosed 100,000,000 tons of 45 per cent. iron ore, with an extensive area yet to be proved. Application is being made to the Commonwealth Government for permission to export two trial shipments of iron ore from the deposit to Japan. An examination of the deposit is to be made by the Mines Department.

Forthcoming Events

FEBRUARY 13

Lincolnshire Iron and Steel Institute:—Meeting at the North Lindsey Technical College, Kingsway, Scunthorpe, at 7.30 p.m. Films.

Institution of Electrical Engineers (South Midland Supply and Utilization Group):—Meeting at the College of Advanced Technology, Gosta Green, Birmingham, at 6 p.m. "The Application of Low-pressure Resins to Some High-voltage Switchgear Designs," by T. R. Manley, K. Rothwell, and W. Gray.

Institute of Marine Engineers (Merseyside and North Western Section):—Meeting at the Engineers' Club, 17, Albert Square, Manchester 2, at 6.45 p.m. "The Future Doxford Marine Oil Engine," by P. Jackson.

FEBRUARY 14

Sheffield University Mining Society:—Meeting in the Mining Lecture Theatre, St. George's Square, Sheffield, at 5 p.m. "Mining the Frodingham Ironstone Bed," by F. Harrison.

South Staffordshire and Warwickshire Institute of Mining Engineers:—Meeting at the Swan Hotel, Lichfield, at 3 p.m. "The Application of Pressure Balancing Chambers to Control Air Movement in Sealed Areas," by W. E. Raybould and G. V. Jolliffe.

Institute of Marine Engineers:—Meeting at the Memorial Building, 76, Mark Lane, London, E.C.3, at 5.30 p.m. "The Design and Layout of a 22,000-s.h.p. Tanker Machinery Installation," by J. B. Main.

Society of Instrument Technology (Bristol Section):—Meeting at the University of Bristol, Department of Physics, The Royal Fort, Bristol 8, at 7.30 p.m. "The Application of Marine Instruments," by E. W. Jordan.

Institution of Engineers and Shipbuilders in Scotland:—Meeting at 39, Elmbank Crescent, Glasgow, C.2, at 6.30 p.m. "Modern Machine Tools and Production Methods."

Society of Chemical Industry (Corrosion Group):—Meeting at 14, Belgrave Square, London, S.W.1, at 6 p.m. "The Occurrence of Fireside Corrosion in Modern Steam Generators," by W. D. Jarvis and D. R. Leeson.

Institution of Electrical Engineers (North-Western Centre):—Meeting at the Engineers' Club, 17, Albert Square, Manchester 2, at 6.15 p.m. "Silicon Power Rectifiers," by A. J. Blundell, A. E. Garside, R. G. Hibberd, and I. Williams.

FEBRUARY 15

Mining Institute of Scotland:—Meeting at the Royal College of Science and Technology, Glasgow, at 5.15 p.m. "First Results from the Experimental Face—Donisthorpe Colliery," by R. F. Lansdown, director, Central Engineering Establishment, NCB, and K. Moore, assistant mechanization engineer, NCB.

Midland Counties Institution of Engineers:—Meeting at the Mines Rescue Station, Mansfield (Notts), at 3 p.m. "Mobile Winding Engines and Multi-layer Rope Spooling," by A. J. G. Coulshed, and "Development of Prototype Listening Equipment for Use Underground," by D. A. Tanfield.

North Wales Metallurgical Society:—Meeting in the Lecture Theatre, Flintshire Technical College, Connah's Quay, near Chester, at 7 p.m. "The Yield Point in Mild Steel," by Dr. W. S. Owen, Professor of Metallurgy, Liverpool University.

Institution of Chemical Engineers:—Meeting at the Geological Society, Burlington House, Piccadilly, London, W.1, at 5.30 p.m. Hinchley Memorial Lecture: "Science and Technology and the Developing Countries," by Prof. P. M. S. Blackett, FRS.

Swansea College of Technology Mining Society:—Joint meeting at the college with the Junior Institution of Engineers, at 6.30 p.m. "The French Mining Industry," by D. H. A. Mathews.

Society of Instrument Technology (Newcastle Section):—Meeting at Roadway House, Oxford Street, Newcastle-upon-Tyne 1, at 7 p.m. "The Education and Training of Instrument Artificers," by B. W. Ramsay.

Institution of Plant Engineers (Kent Branch):—Meeting at the Queen's Head Hotel, Maidstone, at 7 p.m. "Smut Emission from Oil-fired Boilers."

Institution of Production Engineers (Birmingham Section):—Meeting at the James Watt Memorial Institute, Great Charles Street, Birmingham, at 7 p.m. "The Effect of Pacing on Work Performance," by Prof. N. A. Dudley.

Institution of Production Engineers (South Essex Section):—Meeting at the Social Centre, Hoffmann Manufacturing Company, Limited, at 7.30 p.m. "New Welding Techniques," by G. Cubitt-Smith.

Institution of Electrical Engineers (Supply Section):—Meeting at Savoy Place, London, W.C.2, at 5.30 p.m. "A General Theory of Depreciation of Engineering Plant," by D. Rudd.

FEBRUARY 16

Wigan and District Mining and Technical College:—Meeting in the board room of the college at 5 p.m. "Mining Subsidence," by R. J. Orchard, subsidence engineer, National Coal Board.

Combustion Engineering Association (Western Region):—Meeting at the Royal Hotel, College Green, Bristol, at 10 a.m. Discussion on "Factors Affecting the Choice of New Boiler Plant," opened by W. Short (NIFES).

South Wales Institute of Engineers:—Meeting at Park Place, Cardiff, at 6 p.m. "The Single Conductor Multi-channel Signalling and Telemetering System," by F. C. Riches.

Institution of Plant Engineers (Merseyside and North Wales Branch):—Meeting at the Blossoms Hotel, Chester, at 7.15 p.m. "The Plant Engineer's Part in Pipelining Across a Tidal River," by E. Johnson.

Institution of Production Engineers (Glasgow Section):—Annual general meeting at 39, Elmbank Crescent, Glasgow, C.2, at 7.30 p.m., followed at 8 p.m. by "Some Industrial Applications of Magnetic Power," by T. G. Hawker.

Institution of Production Engineers (Reading Section):—Meeting at the Reading Co-operative Society, Limited, Cheapside, Reading, at 7.30 p.m. "Precision Investment Casting," by P. G. Chapman.

Institution of Production Engineers (Southampton Section):—Meeting at the Polygon Hotel, Southampton, at 7.15 p.m. "Materials Handling," by H. P. Mott.

Institution of Electrical Engineers:—Meeting at the Central Hall, Westminster, London, S.W.1, at 6 p.m. Faraday Lecture: "Transistors and All That," by L. J. Davies. Admission by ticket available on receipt of stamped envelope.

Institution of Mechanical Engineers:—Meeting at the James Watt Memorial Institute, Great Charles Street, Birmingham, at 11 a.m. "Some Considerations of the Lubrication of Free-piston Machinery," by R. M. Hosie and G. M. Barrett, and four other papers on related subjects.

Institution of Mechanical Engineers (Southern Branch):—Meeting at the Grand Hotel, Bournemouth, at 7 p.m. "Materials in the Service of Mechanical Engineers," by R. J. Brown.

FEBRUARY 17

North East Coast Institution of Engineers and Shipbuilders Tees-side Branch:—Meeting at the Cleveland Scientific and Technical Institution, Corporation Road, Middlesbrough, at 6 p.m. "Heavy-lift Vessel Adventurer," by C. Stephenson.

Junior Institution of Engineers:—Meeting at Pepys House, 14, Rochester Row, London, S.W.1, at 7 p.m. "Bio-engineering," by H. S. Wolff.

FEBRUARY 23

Institute of Metals (Metal Physics Committee):—Open meeting at the Royal Institution, Albemarle Street, London, W.1, at 5.30 p.m. "The Theory of the Alloys of Copper," by Prof. W. Hume-Rothery, FRS. No tickets required.

National Association of Colliery Managers

FEBRUARY 14

Yorkshire Branch:—Meeting at the Miners' Welfare Hall, Brodsworth, at 3 p.m. "Self-advancing Supports at Cortonwood Colliery," by E. H. Lunness.

FEBRUARY 20

Midland Branch:—Meeting at the Five Ways Hotel, Nottingham, at 6.30 p.m. Paper by C. Rhodes and E. P. Lawrence.

FEBRUARY 23

South Staffordshire, Warwickshire, Worcestershire, and Shropshire Branch:—"Cost Control for Production Management," by J. W. Evans, assistant divisional chief accountant, Courtaulds, Limited.

FEBRUARY 24

Lancashire Branch:—Annual dinner and dance at the Pack Horse Hotel, Bolton.

Kent Branch:—Meeting at the Swan Hotel, Deal, at 7.15 p.m. "The Geological Structure of the Kent Coalfield," by R. Lamb, divisional geologist, South-Eastern Divisional Coal Board.

INVAR PIONEER

Among those research workers who laid the foundations of our knowledge of iron-nickel alloys, Charles Edouard Guillaume, who was born on February 15, 1861, deserves commemorative notice as the discoverer of Invar and Elinvar rather than as a brilliant physicist.

by M. SCHOFIELD, M.A., B.Sc., F.R.I.C.

GUILLAUME's grandfather was a political refugee who came to England from France for a period and established a watchmaking business. This proved a link in Guillaume's story, for he himself was to have as metier or aim in his life's work the finding of some alloy with a coefficient of expansion almost zero, an alloy which obviously would prove ideal for hairsprings and balance wheels of watches. Though Guillaume was more concerned at first with such an alloy as a substitute for platinum in the International Metre, his Invar alloy seemed almost an outcome of his connection with watchmaking.

Charles Guillaume was born at Fleury in Switzerland after the family had returned to the Continent and became a physicist after training at the Zürich Polytechnic. Following some practical experience in mechanics while an artillery officer, he began his life's work at the Bureau Internationale des Poids et Mésures at Sevres just outside Paris. First working under Broch and Benoit he became, in 1915, director of the bureau and gave a total of 53 years' service to the institution. Since the science of metrology became one of Guillaume's subjects of study, the need for exact temperature measurement attracted his attentions, a move which was to give Invar to technology.

Research on Thermometry

Although there was a need to know the linear expansion of new standards like the standard metre to extreme accuracy, it being the practice to use copies in platinum-iridium of the International Metre, Guillaume pioneered research on thermometry and seemed set to remain a physicist. Yet he was concerned in finding some substitute for platinum alloys, some alloy resistant to corrosion yet having a very low expansion coefficient.

A chance discovery while working on iron-nickel alloys brought his work on Invar. Noting in his work that one nickel-iron alloy had an expansion coefficient above that of iron while another alloy had a coefficient below that of nickel, he saw the idea of varying the composition in a protracted series of experiments until he arrived at an alloy with a negligible coefficient of expansion. He needed some practical metallurgist to prepare such a range of sample alloys and was fortunate in finding Henry Fayol of the steel company Acières d'Imphy to carry out such practical work. As a result, came his Invar alloys of iron with 36-38 per cent. nickel, the iron having very low carbon content and the resulting alloy bars, after ageing, remaining constant in length despite variations in temperature.

For geodetic bases, wires of Invar could be used in place of length bars, while in thermostats, pendulums, watch springs, and balance wheels, and in many instruments, the use of a metal with zero expansion was obviously an ideal. Elinvar alloy was the next step with chromium inclusions to give elastic rigidity over an appreciable range of temperature.

Guillaume's work set going much research into iron-nickel alloys and their modification with other constituents. Thus Perminvar came later, an alloy of 30 per cent. iron, 45 per cent. nickel, and 25 per cent. cobalt, which was noted for constant permeability at low magnetizing forces, one so useful for constant inductance.

Guillaume, in 1920, was awarded the Nobel Prize for physics as recognition of this classic work on Invar alloys, work which appeared in many papers in the Journal of the Iron and Steel Institute. In this journal and in the Revue de l'Industrie Minerale in 1922 he described his search for platinum substitutes for standards, one which benefited watchmaking. Guillaume, like many French metallurgists, such as Réaumur and Le Chatelier, began as pure scientist yet in metallurgy proved a versatile genius.

Essays and Papers on Corrosion Science

The education panel of the Corrosion Group, with the approval of the council of the Society of Chemical Industry, established in 1955 a competition designed to encourage those who are still in the early stages of their career to take an interest in corrosion science and to express their ideas in writing. With the support of industrialists interested in the application of corrosion science in industry, a prize to the value of 25 guineas will again be awarded this year for an essay or paper on any aspect of corrosion of metals and its prevention. The closing date for receipt of entries is March 31. Details of the competition may be obtained from the Secretary, Society of Chemical Industry, 14, Belgrave Square, London, S.W.1.

Mines Safety in the North-East

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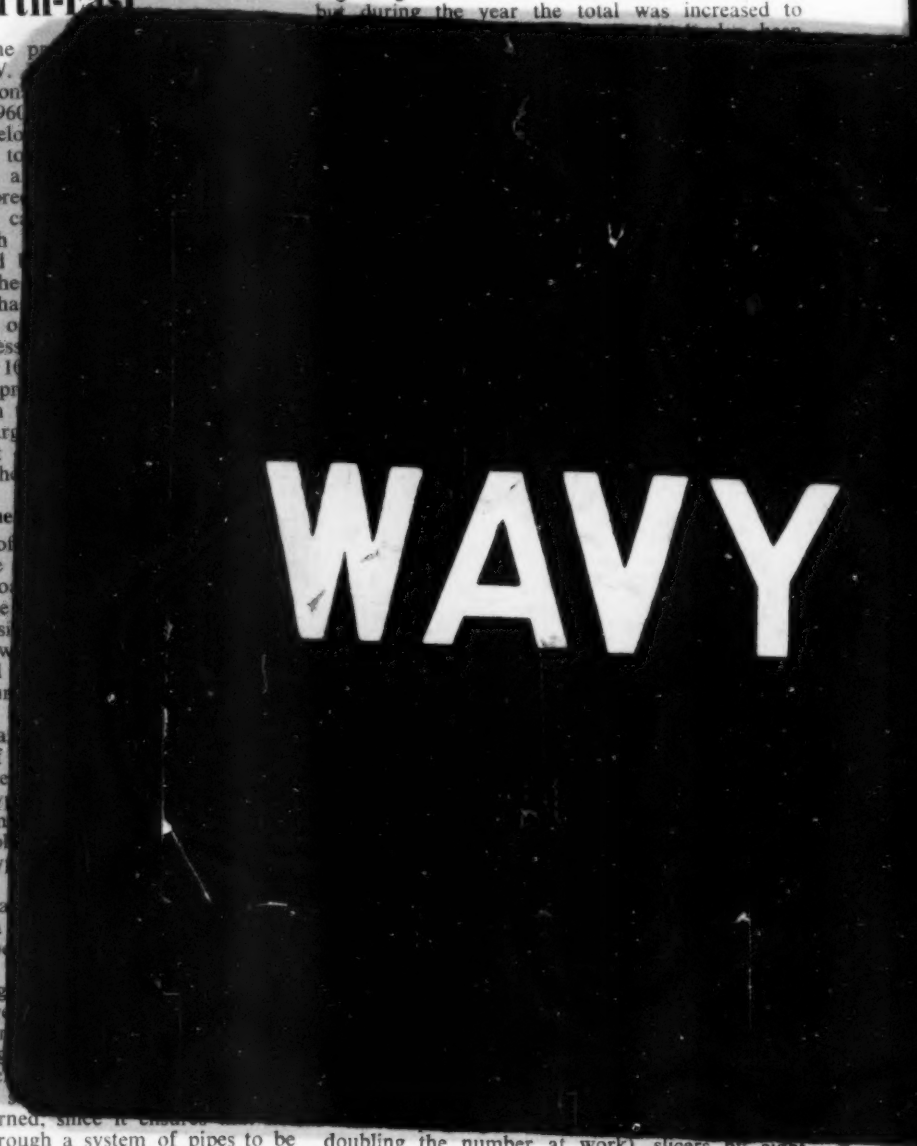
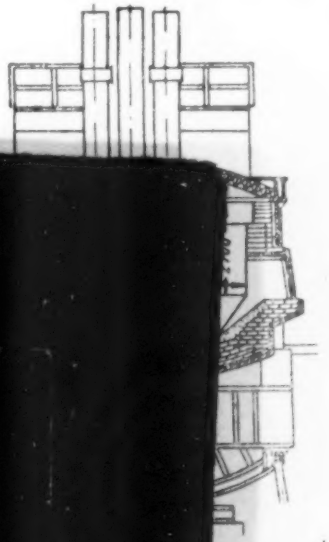
New instruments continue to be introduced to facilitate investigation of strata behaviour at and around the coal face and improved standards of support have been obtained from a study of the design and application of hydraulic and mechanical yielding supports. Progress has also continued in the introduction of hydraulic chocks of Coal Board design for support of the waste edge. At the beginning of 1960 about 300 of these were in use, but during the year the total was increased to



doubling the number at work), slicers by eight, Meco-Moores by four, and ploughs by four. In addition, a new machine, the Trepan shearer, which combines the simplicity of operation of the shearer with the ability of the trepanner to produce large coal, is to be introduced and by the end of the year it is hoped that up to 10 of these machines will be operating.

80-TON ELECTRIC FURNACE



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Charging of the furnace is done by means of a bucket of 4,500 mm. dia. of 50 cu. m. capacity, with chain-operated opening segments.

* The height of the melting zone is given as 2,300 mm., as in the previous paper (IRON AND COAL, January 15, 1960), although Fig. 1 shows 2,700 mm.—Metallurgical Editor.

PAGES

Mines Safety in the North-East

DEALING with the problems of safety underground, Mr. W. H. Sales, chairman of the North-Eastern Divisional Coal Board, in his recent annual report for 1960 referred to the technique which has been developed in the division involving the use of foam to reduce the risk of igniting gas when explosives are used at rippings. After holes have been bored in the ripping face and before the explosive cartridges are inserted, foam is injected into each hole under pressure. This seals the breaks and bed separations so that gas is excluded from the vicinity of the explosive. Suitable equipment has been developed and trials are being conducted on a wider scale.

The use of compressed air—involving the use of air compressed to 10,000 lb./sq. in., has been extended. The compressed air is fed into a shell inserted in a hole in the coal face, and when the air is rapidly discharged from the shell, the coal is broken down. It eliminates the use of explosives and the risk inherent in them.

Further Installations

At the beginning of 1960, the system was in use at 10 collieries; there are now 23 installations at 18 collieries blasting coal on 42 faces. A further eight sets of equipment were being installed at the end of the year and six more were due for delivery. It is expected that within a few months over 90 faces will be blasted by this technique and during the current year a further 14 sets of equipment are to be installed.

Throughout the past year trials with new explosives and systems of blasting have continued and, in particular, the technique of blasting rippings using a new prototype 12-shot exploder with new types of delay-detonator and explosive has been very successful. Following these trials additional exploders of this type are being introduced this year.

The system of draining firedamp through holes bored into the strata above working faces has been extended. At the beginning of the year the technique was in use at 15 collieries and about 4,000,000 cu. ft. of gas per day was being drained. By the end of the year, this had been extended to 21 collieries, draining a total quantity of about 5,500,000 cu. ft. of gas per day.

This drainage technique has given greatly improved standards of safety and working conditions in the mines concerned, since it ensures that the gas is conducted through a system of pipes to be discharged in a safe place so that it cannot contaminate the ventilation in the working area.

New instruments continue to be introduced to facilitate investigation of strata behaviour at and around the coal face and improved standards of support have been obtained from a study of the design and application of hydraulic and mechanical yielding supports. Progress has also continued in the introduction of hydraulic chocks of Coal Board design for support of the waste edge. At the beginning of 1960 about 300 of these were in use, but during the year the total was increased to 850. Total caving of the waste had also been extended.

Trials with special bars for the support of roadheads were successfully concluded and orders have now been placed for some 500 for delivery early this year. The chairman states that he is confident these special bars will have a wide application.

Towards lessening the effect of accidents, developments continue in firefighting procedure. In addition to the training in firefighting of 150 more underground workers and some 100 surface workers—training that has already proved its worth—160,000 yd. of water mains have been laid either as new installations or as additions to existing installations.

Referring to technical advances made in the division during the year, Mr. Sales, reporting on the use of hydraulic powered supports, states that one such powered support installation has given a particularly interesting performance. Although adverse roof conditions were encountered, due to old workings in a seam below, the total tonnage got from that face since installation of the supports in August, 1959, up to December 3, 1960, was 263,196 tons at an average o.m.s. of 15.74.

One roadhead has now been equipped with powered supports specially designed for that purpose and another type developed in the division is under construction. It is felt that the successful application of powered supports in this part of the workings will be a vital contribution to safety and improved efficiency.

Power loading has increased in the division by nearly 5 per cent. to 32.75 per cent. and the number of power-loading machines of all types was increased by 21. The types and numbers of machines now working are as follow:—Meco-Moore cutter loaders, 37; Anderson Boyes trepanners, 48; Huwood slicers, 22; coal ploughs, 6; Anderton shearer loaders, 47; Huwood loaders, 6; Multijib cutter loaders, 19; Lambton flight loaders, 6.

The increase of 25 in the number of the more important machines was mainly confined to those designs which produce a good proportion of large coal. During 1961 it is intended to continue to increase the output obtained by power loading in the division and to step up significantly the rate of increase compared with previous years. Almost all the additional machines that are put to work will be those which produce a reasonable proportion of large coal.

It is hoped to increase trepanners by 39 (almost doubling the number at work), slicers by eight, Meco-Moores by four, and ploughs by four. In addition, a new machine, the Trepan shearer, which combines the simplicity of operation of the shearer with the ability of the trepanner to produce large coal, is to be introduced and by the end of the year it is hoped that up to 10 of these machines will be operating.

80-TON ELECTRIC FURNACE in RUSSIA

Refractories Usage and Steelmaking Practice

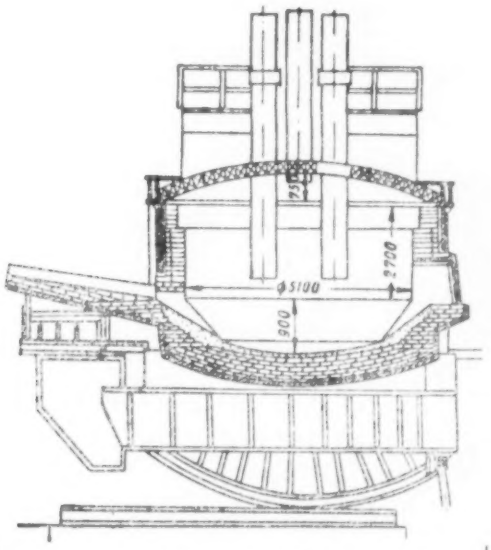


FIG. 1.—CROSS-SECTION OF 80-TON ELECTRIC FURNACE.

by V. K. PETROV and B. V. BARVINSKII

The January 15, 1960, issue of IRON AND COAL *contained an article from Metallurg, 1959, No. 9, by L. S. Katsevich describing the design and operational features of a new 80-ton electric-arc furnace in Russia. A further article which describes the experience of the early campaigns on this furnace with particular reference to refractories usage and the evolving of a satisfactory steelmaking procedure appeared in Metallurg, 1960, No. 6. The following is a translation of this article.*

THE 80-ton electric-arc furnace was made to the design of the O.K.B. Trust, "Elektropech," at the Novosibirsk works for thermo-electrical equipment. It is shown in cross-section in Fig. 1.

Technical Data of the Furnace

Inside dia. of shell, mm.	6,300
Transformer rating on full voltage, kVA.	25,000
Range of secondary voltage, V. ..	417 to 131
Maximum current, A.	3,500
Diameter of striking circle of electrodes, mm.	1,750
Electrode dia., mm.	555
Electrode travel, mm.	3,300
Height of melting space from sill to the top of shell, mm.	*2,300
Depth of the bath from sill, mm. ..	900

Charging of the furnace is done by means of a bucket of 4,500 mm. dia. of 50 cu. m. capacity, with chain-operated opening segments.

The banks of the furnace are built with magnesite bricks laid flat. Thickness of the bank at the base is 1,200 mm. and at the walls 600 mm. Thickness of the bottom is about 900 mm. For thermal insulation, the bottom of the furnace is lined with asbestos sheet of 20-30 mm. thickness. To smooth out the bolt heads and facing, and to give a spherical form to the bottom, chamotte is deposited on the asbestos. On this deposit, which is about 20 mm. thick, two courses of fire-clay bricks are laid flat. Joints in the brickwork are filled with dry finely screened chamotte powder of not more than 0.5 mm. in grain size.

On this insulating layer, five courses of magnesite bricks are laid on edge in herringbone pattern, starting from the centre of the furnace and working towards the walls. Each successive course is set at an angle of 45 deg. to the preceding course in order that the joints of the courses do not coincide. The bricks are laid dry, cutting to size and grinding to make good joints being done as necessary. Joints should not exceed 1 mm. After each course is laid, the joints are filled with dry magnesite powder,

* The height of the melting zone is given as 2,300 mm., as in the previous paper (IRON AND COAL, January 15, 1960), although Fig. 1 shows 2,700 mm.—Metallurgical Editor.

of grain size less than 0.5 mm., and this powder is compacted with wooden laths.

The vertical part of the furnace shell, corresponding to the height of the sloping sides of the bottom, is insulated with asbestos sheet of 10-20-mm. thickness and with lightweight chamotte bricks laid on end. The slopes are built in steps using normal and intermediate wedge-shaped magnesite bricks laid flat. Finally, it should be noted that high quality, carefully selected bricks are used for the bottom and slopes.

Magnesite Paste

After a preliminary warming to 40-50 deg. C., the bottom is filled with a magnesite paste of the following grading:—Magnesite grains less than 2 mm., 75 per cent.; magnesite grains from 2 to 4 mm., 25 per cent. made by first heating the grains to 80-85 deg. C., then adding 10-12 per cent. by weight of coal tar and thoroughly intermixing. This paste is spread on the bottom of the furnace and compacted with pneumatic rammers in layers 20 to 30 mm. thick. The walls are built with thermally stable magnesite-chrome or unburned metal-cased bricks. The dimension of the bricks is 460 mm. and 380 mm. and the thickness of the walls at the base about 600 mm. with a step change to 450 mm. To a height of 100-150 mm. above the slag level the walls are of magnesite bricks, and above that of magnesite-chrome bricks.

For construction of the roof fired magnesite-chrome bricks of 300 mm. thickness are used, being set in a cooled metal collar of welded construction on a template with rise of arch of 750 mm. A main central supporting arch is laid between the electrode openings with its ends resting on the skewback bricks. An auxiliary supporting arch passes between two electrode openings with one of its ends against the central arch and the other on the skewback bricks. Then the angular sections of the roof bounded by the central arch and the skewback are laid using wedge-shaped bricks. Finally, the electrode openings are finished off. The bricking of the roof is done dry.

Furnace Heating

The new furnace is heated in the following way. The bottom is covered with iron plates and lime; then about 60 tons of pig-iron is charged. Melting of pig-iron is done on a reduced power input of the transformer, with gradual decrease of voltage as the electrodes approach the bottom. As the pig-iron melts a basic slag is formed. The molten iron is kept in the furnace for 3 to 4 hr. After tapping this iron, the hearth lining of tarred magnesite paste has become baked sufficiently and steelmaking can be started. The first five or six melts on a new bottom are carried out with a decreased heat input, and then normal operation of the furnace starts.

During the run of the furnace the following observations concerning refractory material were made. The walls made of magnesite bricks lasted 25 to 30 melts, but even in the first few melts bricks were spalling and pieces falling on to the banks. After 10 to 15 melts the walls had to be repaired in some parts. A change to magnesite-chrome brick increased the wall life to 60 to 65 melts.

As a rule the walls wore unevenly, the biggest wear being observed in the zones opposite the electric arcs. It was noted that the greatest heating occurred opposite an electrode with an unduly high power input. After levelling out of the power per phase, the heating of the walls was reduced. Exceptionally poor wall life occurred when working a small charge when the primary portion of the charge was less than 55 tons. When melting a small quantity of metal, the arc quickly exposes itself and overheats the banks and lower part of the walls causing severe wear. Therefore, for small charges melting should be carried out with a low power input in order to conserve the lining of the furnace. When necessary, patch repairs of the walls are carried out with bricks.

Roofs constructed from 300-mm. thick silica bricks failed after 11-15 melts, while magnesite-chrome roofs lasted 60-85 melts without patching. It was noted that towards the end of the campaign, with comparatively little wear of bricks—about 50 per cent.—the centre of the roof began to settle in and peripheral parts to bulge.

Insufficient mechanical stability of the roof is also associated with the extensive use of bricks which are cut to fit, this cutting being necessary because magnesite-chrome bricks are made with dimensions to suit open-hearth furnaces without consideration for electric furnace construction. In order to increase stability of the centre of the roof, it was decided to replace countersunk cooling rings with lighter superimposed ones.

Experience showed that in order to increase durability of the furnace lining and adapt the furnace to the melting of transformer steel it was desirable to broaden the furnace shell, to build inclined walls, to use thermally stable bricks free from chrome for the walls and roof, to check thermally stable magnesite bricks for spinel compounds, and to develop and test as soon as possible a roof of suspended construction.

Steelmaking Practice

At first the normal shop practice was adapted, but difficulties peculiar to big furnaces arose. The removal of phosphorus from the charge during the period of the boil necessitated large quantities of lime and ore, and the expenditure of much time and labour. It was not always possible to remove sufficient phosphorus because of the risk of overheating the bath and the untimely addition of the required quantity of lime and ore. In some instances disruption of the bottom because of overheating of the bath occurred.

Charging the furnace by a bucket often causes obstruction of the working door by the charge, so making it difficult to achieve timely formation of slag, and, as a result of this, the arc overheats the walls and banks.

The first few months of operation showed that the accepted practice for furnaces of small and

medium capacity was unsuitable for 80-ton furnaces and, taking into consideration characteristics of electric furnaces of higher capacity, a new, more rational practice was worked out.

To assist early slag formation and to safeguard the bottom of the furnace, the bottom is covered with about 600 kg. of lime, but if the bottom is shallow and the charge heavy, lime is not introduced. The charge materials are blended so that content of carbon when melted is 0.30-0.35 per cent. higher than the steel specification. It is essential to complete charging in one or two operations (bulk weight of 1 cu. m. of charge must be not less than 1.6 ton).

To effect some dephosphorization during the melting period 2.5-3.5 per cent. of lime is added with the second part of the charge, the percentage being based on the weight of charge and ore, the quantity of which should ensure that the content of carbon in the metal after melting is near the required limit. As a rule, melting is done on the maximum power of the transformer, but with a small first charge (less than 60 tons), in order to safeguard the bottom, the melting is done on lower power input. Towards the end of melting of each portion of the charge the power input is reduced.

For lancing the charge with oxygen, pipes of $\frac{1}{2}$ in. dia. are used. Towards the end of melting there should be a fluid, slightly foamy slag which should flow readily over the sill of the working door. This practice makes it possible to reduce the phosphorus content to under 0.015 per cent. without an additional boil after melting down. A small boil is necessary to even out the temperature of the bath. Refining is done according to the usual practice under a white or slightly carbide slag.

A stator for magnetic mixing is put into operation for 10-15 min. at the end of melting, for the whole of the time that slag is being skimmed and for 3 to 5 min. when taking samples or measuring the temperature of the metal.

Duration of the melt sub-divided into each operation has recently been as follows:—

	Hr.	*Min.*
Fettling	—	43
Charging	—	11
Melting (includes time for auxiliary additions of the charge)	3	44
Boiling	—	20
Deslagging	—	10
Refining	—	47
	5	55

This practice of making carbon steels has justified itself on the 80-ton furnace. Experience has shown that such furnaces with appropriate melting practice can meet all the requirements for producing good quality steel.

NICKEL AND CHROMIUM RECOVERY
in the Electroplating Industry

WASTAGE of nickel and chromium salts in the electroplating industry is not only substantial but often causes a pollution problem to both the electroplater and the drainage authority. The results of a survey by the Department of Scientific and Industrial Research, in co-operation with the British Non-Ferrous Metals Research Association and the electroplating industry, have been published under the title "A Survey of Nickel and Chromium Recovery in the Electroplating Industry." Promising lines of attack for the eliminating of waste and the reduction of pollution are discussed.

Nickel and chromium salts are largely wasted by "drag-out"—when the solution is carried away by plated articles as they leave the plating bath—though spray formation is often a cause. Out of an estimated total weight of 2,870 tons of nickel used by the plating industry in 1958, about 290 tons represented the metal content of the nickel sulphate and chloride used. These chemicals increase the total material cost by about 13 per cent. But the use of a simple static rinse tank has been found to eliminate three quarters of the cost of these added salts. Installation of such a tank in a manually operated plant is usually inexpensive, and the outlay may be recovered within one year. Reduction in water consumption by use of counter-flow rinses is also recommended.

The author, E. P. Harris, further concludes that there is great potential value in the ion-exchange process for the purification and re-use of effluent solutions. At present this process is handicapped by the initial cost of equipment and lack of operating experience. It is, however, a promising alternative to present effluent treatment by chemical means, which reduces impurities to a valueless sludge.

Copies of the booklet can be obtained, free of charge, from the Library, Department of Scientific and Industrial Research, 5-11, Regent Street, London, S.W.1.

ACCORDING TO Mr. Ralph Stanley, chief technical officer of the Southern Rhodesian Department of Mines, who recently visited Japan and Australia on behalf of the Rhodesian mining industry, Southern Rhodesia has a very good chance to build up iron-ore and coking coal exports to Japan valued at several million pounds a year. He said Southern Rhodesia could probably export 300,000 to 500,000 tons of iron-ore and 2,000,000 tons of coal per annum to begin with. This would represent a revenue of about £2,500,000 at a conservative estimate founded on prices at the mine.

New Equipment and Products

Table-mounted Earth Borer

PRODUCTION of a new rotary table-mounted earth borer is announced by Cheshire Engineering Company, Limited, Camberley (Surrey). It is suitable for use in conjunction with the short wheel base Ford Thames Trader 4 by 4 unit (Fig. 1). The new mounting makes it possible to obtain rapid spotting of the auger on piling construction, thereby minimizing the vehicle movement.

FIG. 1.—FORD THAMES TRADER FITTED WITH A TABLE-MOUNTED EARTH BORER.

A similar borer recently purchased by the GPO is equipped with power hoist for erecting telegraph poles in addition to the new rotary table. This enables holes to be drilled and poles set along roadways without the necessity of shunting the carrying vehicle across the highway.

Constant Rate Feeder

FINELY controlled and highly stable feeds or doses of granules, flakes, powders, pastes, sludges, and minerals are provided economically by the Watson-Marlow constant rate feeder (Fig. 2), which, operating on what is believed to be an entirely new principle, dispenses broken solids and other materials at a constant volumetric rate so accurately that dosing by weight within about 1½ per cent. is achieved on a time basis alone.

A table rotates beneath a fixed hopper throat which has an aperture in its base. Hinged on one side of the aperture is a blade which projects through it towards the centre of the table and out beyond its perimeter.

The unit is sited beneath a hopper containing the material, which is allowed to fall down the hopper throat to rest on the central portion of the table. Rotation of the table causes a section of the material to travel along the blade, through the aperture, and out over the table edge, to be collected by a chute. At the same time, the internal friction of the material in the hopper throat induces a spiral stirring action which keeps it moving down to the table face.

In travelling along the blade, the material being dispensed is acted upon by two opposed forces—one outwards towards the table perimeter and the other transverse to it against the face of the blade. There is a continuous inverse variation in these forces as the material progresses, and a balance, which is self-compensating for irregularities of emergence from the aperture, is reached at the table edge. Thus, if the material coming through the aperture is less than that required to maintain the final feed rate, the effect of the transverse or tangential force is reduced in relation to that of the outward or radial force and the flow of the material automatically speeds up, even though the table speed remains constant. Conversely, the emergence of too much material—for example, an unusually large agglomeration—strengthens the tangential force and slows down the stream of material emerging from the aperture.

Delivery rate is coarse-controlled by the angular setting of the blade, which governs the size of the throat aperture, and fine-controlled by the speed of the table rotation.

Feeds ranging from a few grains per minute of fine materials up to 1 ton/hr. of heavy materials are obtainable on the one unit. Delivery rates vary almost linearly with the table speed and once calibrated for a given material, settings can be read from a simple graph to provide any nominated rate.

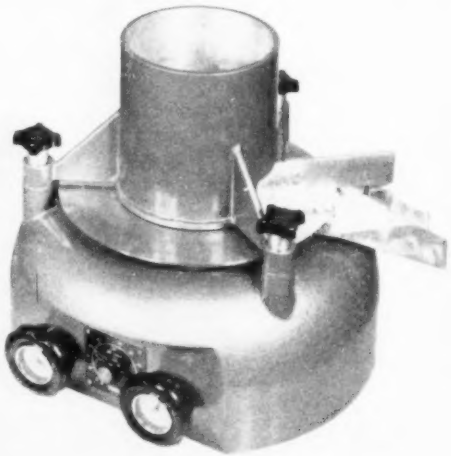


FIG. 2.—THE WATSON-MARLOW CONSTANT RATE FEEDER.

Power requirements are low, the unit being offered with a ¼-h.p. single-phase or ½-h.p. three-phase motor. The whole unit measures only 14¾ in. to the top of the 6-in. dia. hopper throat and 16¾-in. dia. at the base. It weighs 75 lb.

Examples of materials handled include wet and dry sands, coal dust, and manganese ores.

The feeder is manufactured by the Watson-Marlow Air Pump Company, Marlow (Bucks).

US Excavator for British Market

FIRST product of a manufacturing agreement made in January of this year between R. H. Neal & Company, Limited, Grantham, and the Unit Crane & Shovel Corporation, Milwaukee, USA, is a ¾-cu. yd. capacity excavator known as the Neal-Unit (NU 1620) shown in Fig. 3.

Designed for use as a dragline, drag shovel, face shovel, or conventional crawler-mounted crane with speedy conversion of front end attachments, this

FIG. 3.—THE NEAL-UNIT (NU 1620) EXCAVATOR EQUIPPED FOR OPERATION AS A DRAG SHOVEL.

machine is the result of many successful years' operational experience in the USA.

It will be manufactured at Grantham by R. H. Neal & Company, a member of the Steel group of crane and excavator manufacturing companies.

Venturi Double Scrubber

FOR collecting solids from all kinds of industrial fume, smokes, or exhaust gases, Ambuco, Limited, Standbrook House, 2-5, Old Bond Street, London, W.1, has introduced a venturi scrubber (Wagner-Biro system) having three main features:—(1) The method of introducing the water achieves a double scrubbing action; (2) the water droplet size can be varied to deal with varying types of solid particles, and (3) pressure loss and power requirements are low.

Double scrubbing is effected by introducing the water ahead of the venturi by means of a special nozzle spraying directly into a specially shaped entry, so arranged that the gases are compelled to pass through two complete cones of water. In the first cone, the water droplets are of a relatively large size and are primarily effective in collecting the coarser solid particles. In the second cone (produced by the venturi entry shape), the droplets are considerably finer and their velocity is reduced. At the same time the velocity of the gas and dust particles increases as it passes the venturi. This results in ideal conditions for the collision of the dust particles and fine water droplets, with consequent maximum collection efficiency of the finest of particles. Droplet size is controlled by positioning the water introduction nozzle relative to the venturi entry, which enables optimum results to be obtained for any given set of conditions. Whatever droplet size is selected, the double scrubbing principle is maintained.

Electro-magnetic Lifting Beams

COVERING lifting capacities of from 2 to 20 tons, or greater if required, the new Melbro range of electro-magnetic lifting beams, made by the Melbro Machine Tool Company, Limited, has been designed to reduce plate-handling costs in shipbuilding and other constructional work. At an important shipyard, trials with the smallest beam, which incorporates two powerful M4 magnets each exerting a cohesive force of 6,615 lb., labour savings of more than 40 per cent. were effected in the handling of plate sections. Larger beams, incorporating a series of up to 16 M4 magnets, have led to savings of up to 50 per cent. in all handling work.

The Melbro lifting beam is suspended by chains from a mobile or permanent crane and is operated by the crane driver. The magnets are powered by the supply feeding the crane, or in the case of a mobile crane from a 24-V battery. The design provides the necessary safety precautions in case of power failure when working on high voltages.

A special unit has also been developed for lifting ferrous plate sections from the horizontal to the vertical. This consists of a triangular-shaped tubular frame with a lifting hook at the apex and an M4 magnet at each of the two base plates. The magnets are pivot mounted so that plates lifted from the horizontal are swung by their own weight through 90 deg. to the vertical. An increased crane payload is obtainable with all units in the range because each one has the unique characteristic of being approximately half the weight of conventional lifting magnets of the same capacity.

Further details of these lifting beams may be obtained from the firm at Melbro House, 2a, Alexandra Road, Manchester 15.

A PLANT TO PRODUCE special steels is to be set up in Argentina by Hoesch A.G., Dortmund, according to its managing director, Herr Gerhard Elkmann, quoted in Handelsblatt, Düsseldorf. With a preliminary output of 500 tons monthly, later to be increased to 1,000 tons, it will produce special steels for use in the manufacture of cars and of railway stock. The works are scheduled to commence operating mid-1961. To carry out the project, a company, Hoesch A.G., Argentina, has been formed; initial investment will be 100,000,000 pesos (£425,000).

New Literature

CATALOGUES, house magazines, booklets, and other publications received recently include those mentioned below. Readers wishing to obtain a copy of any of the items referred to should apply direct to the address given, at the same time mentioning IRON AND COAL.

BAKER PERKINS, LIMITED, Mineral Processing Division, Blackhorse Road, Letchworth (Herts)—No. 4 in the series of TBE Bulletins, issued by the company in association with Makhtsavei Israel (Israel Mining Industries), is now available. There are short articles by members of the staffs of both undertakings.

SCIENTIFIC INSTRUMENT MANUFACTURERS' ASSOCIATION OF GREAT BRITAIN, 20, Queen Anne Street, London, W.1—SIMA Review, No. 1, which has made its appearance, will be published twice a year. It replaces the former SIMA Bulletin, which was largely concerned with the association's internal matters.

MASTABAR MINING EQUIPMENT COMPANY, LIMITED, Avenue Parade, Accrington (Lancs)—"Making Ends Meet" is the title of an article in the January issue of the Comet and it is all about belt conveyors. A new approach to economical mining in Co. Durham is described in "Coal Factory," while a further interesting contribution to the magazine is "Comet in the Rhondda."

DENVER EQUIPMENT COMPANY, Denver 17, Colorado, USA—The November-December, 1960, number of Deco Trefoil, full of Christmas and New Year greetings, has arrived somewhat belatedly. Many of the contents, however, are by no means dated. Most of the issue is devoted to the company's activities in South Africa, and the feature on the M.T.D. (Mangula), Limited, plant is of particular interest.

HADFIELDS, LIMITED, East Hecla Works, Sheffield 9—"Die Steels" is the subject of a new publication (No. 550). In many spheres of industrial activity complex shapes in metallic and non-metallic substances are formed by hot or cold pressing into steel dies. Such a wide variety of application involves the use of many different types of steel and the brochure sets out to offer an indication of the factors affecting die steel selection and, at the same time, brief details of those steels made by Hadfields.

PRESSED STEEL COMPANY, LIMITED, Oxford—First issue of Picture Press, a 36-page, four-colour "house magazine with a difference" has just made its appearance. The "difference" is that, although its prime purpose is to deal with the chief activities of the company itself, it does not intend to "shut itself up behind the factory walls, and contemplate only on the things which it makes, or the markets in which it sells them." Picture Press has got off to a good start with an issue containing an imposing variety of articles and features. The art work is striking. Sketches by Paul Hogarth are included.

SUFFOLK IRON FOUNDRY (1920), LIMITED, Sifbronze Works, Stowmarket (Suffolk)—The winter issue (No. 110) of Sif-Tips has just been published (6d.). There is evidence that readers of this welding quarterly value the journal sufficiently to keep it for years. In Sif-Tips No. 23, published in 1938, there was inserted a reply-paid postcard asking readers interested in a certain leaflet to return the card in order to obtain a copy. A few weeks ago the company received one of these cards. And it had not taken the Post Office 22 years to deliver it. The card had been mailed the day prior to receipt! We are sure that the average reader does not take so long to go through his copy of Sif-Tips.

ARMSTRONG WHITWORTH (METAL INDUSTRIES), LIMITED, Close Works, Gateshead-on-Tyne—Writing in the December issue of Close-Up, the company's quarterly magazine, Mr. M. L. Wilson, the editor, refers to the fact that the magazine has now completed a two-year series in its present format, and he expresses the belief that each issue has been well received. We are sure he is correct in his assumption. Close-Up, which claims to give news about people and products, does, in fact, achieve far more than that. It includes a number of articles, maintaining a fair balance between technical and less formidable subjects, and the production generally is of a high standard. Mr. Wilson voices a mild complaint—one that is shared by the editors of many house magazines: he feels he is not receiving enough support from those who might feel competent to contribute feature articles. We hope that his colleagues will hasten to put pen to paper so that the standard of Close-Up may be maintained.

MOND NICKEL COMPANY, LIMITED, Thames House, Millbank, London, S.W.1—The December issue of the Nickel Bulletin (published at the end of January) gives a good indication of the indispensable role which nickel has assumed in practically every branch of industry. In the section on nickel and its compounds, reference is made, for example, to literature on high-purity cathode nickel and to a symposium on "Fuel Cells." Items pertaining to electrodeposition are followed by sections on non-ferrous alloys (*e.g.*, nickel-containing brasses resistant to stress corrosion, nickel-aluminium bronze for marine propellers), on the properties and applications of nickel-iron magnetic alloys, on cast iron (economic advantages offered by "Ni-Hard" grinding balls), and on nickel-containing high-strength steels. In the final section, that concerned with heat- and corrosion-resisting materials, the literature abstracted ranges in content from dispersion-hardened materials and thermal fatigue of turbine blading, to the resistance of nickel-containing steels and alloys to specific corrosive media.

"Ironmonger Diary and Hardware Buyers Guide"

THE usual features of the "Ironmonger Diary and Hardware Buyers Guide" are contained in the 1961 edition of this useful publication. As the foreword rightly points out, it is necessary to know one's way about a comprehensive classified directory such as this if the best value is to be obtained from it. The publisher, therefore, proceeds to underline its main features. The Buyers Guide section, for instance, contains 47,100 names of suppliers classified under headings. The alphabetical section contains the names and addresses, telephone numbers, and telegraphic addresses of all the suppliers given in the classified section to the number of 7,800.

In addition, there is the classified section of factors and stockholders and merchants, two of the most used parts of this volume, which is published by the Ironmonger, 28, Essex Street, Strand, London, W.C.2.

FEATURES OF *1961 Leipzig Spring Fair*

VISITORS to the Leipzig Spring Fair (March 5 to 14) will see the displays of about 9,000 exhibitors from 50 countries. More than 200 British firms will be showing their goods. Technical advances made in countries in various parts of the world will be evident in the heavy industry exhibits.

From its comprehensive manufacturing ranges, VEB Schwermaschinenbau "Ernst Thalmann," Magdeburg, is showing a four-high rolling mill for the plating of steel strip with a non-ferrous metal plating charge on both sides. The machine incorporates working rolls of 230 mm. wide and may be employed for widths of strip of up to 220 mm. The strip is rolled out from an initial thickness of 2.2 cm. to a final one of 0.66 mm. The balancing of supporting and working rolls is by means of an oil-hydraulic mechanism. In front of the rolls is a strip feeding table to which the two non-ferrous metal strip drums are attached. Built-in auxiliary mechanisms enable the working rolls, or the entire set of rolls, to be exchanged in a minimum of time. Indication of roll speeds and roll gaps is by electrical instruments. All functions of the rolling machine, including that of the oil-hydraulic mechanism, can easily be effected by pressing push-buttons.

Cranes for Steelworks

The German Democratic Republic is a large exporter of cranes for use in iron and steel works and, in this connection, the redesign of a 350-ton travelling casting crane will be of particular interest. One of the two rope drums of the main lifting mechanism will be shown in original size. These two drums lift a mass of 350 tons to a height of 16 m. via four pulleys of 12 cables each. The drum is of welded construction and has been annealed to remove internal stress. It has a diameter of 1,850 mm., a length of shell of 2,785 mm., an overall length of 3,465 mm., and a mass of 7.3 tons, including the drum wheel.

VEB Schwermaschinenbau "Heinrich Rau," Wildau, will show a sheet-metal straightening machine, which, being a standardized machine (by a maximum use of standard units), is indicative of the trend of development of 12 series. The machine incorporates seven straightening rolls, five of them being driven. The four upper rolls may be adjusted by either raising or lowering the upper beam. In addition, the two upper outer rolls may be adjusted vertically by means of eccentric rolls. The machine is a welded construction exclusively made of open-hearth steel.

From the same works comes a swaging hammer with an impact of 10 M.kg.m. Thanks to a mass which is lower than that of anvil bed hammers, these swaging hammers are ideal for dropforging with the exception of forging work requiring the use of tongs. The hammer frame consists of a fluted cast-wheel plate bearing the four welded uprights. The hammer is provided with a servo control mechanism, its number of blows amounting to 80/min. max. and at full impact to 55/min. It has a mass of 60 tons.

In the past five years exhibits at Leipzig Spring Fairs have included new types of wire-stranding machines designed to meet the manifold requirements made by the makers of wire cables.

The high-speed stranding machine SR 6 by 400, exhibited by VEB Schwermaschinenbau "Ernst Thälmann," Magdeburg, has six coils of 400 mm. dia. with a capacity of 145 kg. of steel wire each and serves for the stranding of steel, copper, and aluminium wire having a diameter of from 0.8 to 2.6 mm. Accurate adjustment is made possible by a novel idler bearing. By means of a gearbox the stranding tube may be set to three speeds (500, 700, and 1,000 rev./min.). In case of wire breakages and idle running of coils the machine is stopped automatically. The drum of the winding-on attachment is housed in non-axle bearings and may be installed with the aid of a hydraulic lifting gear.

A winding machine for winding 3-mm. wires, newly developed by the same makers, is claimed to be superior to other designs since its speed of winding may be adjusted according to the size of coil between 70 and 200 m./min. by means of an infinitely variable gearing. This regulation of winding speed makes for an increase in output of 45 per cent. In case of wire breakages and when reaching the preset yardage, the machine is stopped automatically.

The most striking feature of technical advances made in open-cast lignite mining is the development of mobile conveyor plant for underhand stopes. Following the driving station shown last year, exhibits in this field at the 1961 Fair will include a caterpillar-tracked intermediate belt of 30 m. distance between axles designed for a haulage capacity of 1,000 ton/hr. of raw lignite. The 1,000-mm. wide conveyor belt travels at a speed of 3.55 m./sec.

Continuous conveying also enables the large haulage machinery to be used more economically. The overall range of open-cast mining equipment built in the GDR will be demonstrated by a comprehensive show of models, but there will also be displayed a number of machine parts in original size, such as the articulated ladder of the largest revolving shovel, type Ds. 1,600, and a jib with non-bucket paddle wheel of the excavator, type Sch. Rs. 315.

Purchasing Course at Oxford

Primarily intended for those holding senior purchasing appointments in industrial and public undertakings, an advanced purchasing course is to be held under the auspices of the Purchasing Officers Association at Christ Church and Pembroke College, Oxford, from April 10 to 14. Full details of the arrangements may be obtained from the association at Wardrobe Court, 146A, Queen Victoria Street, London, E.C.4.

Armstrong Whitworth's Roll Output Expansion

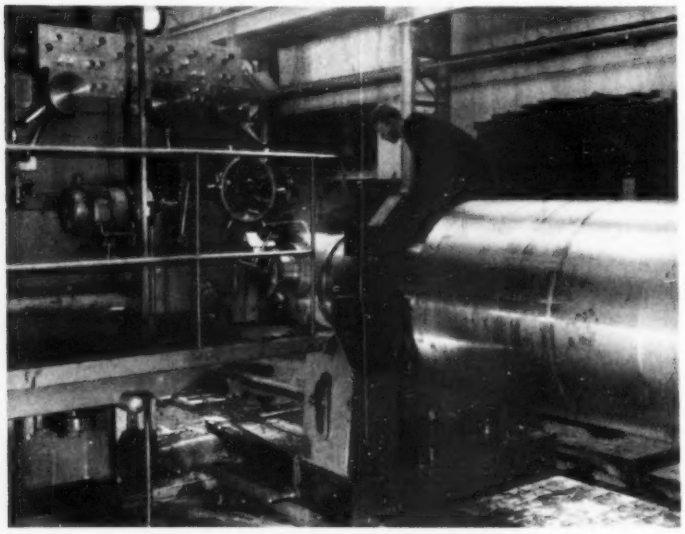
FOUR modern pieces of plant have now been installed in the latest extension to the roll-production shops of Armstrong Whitworth (Metal Industries), Limited, Close Works, Gateshead-upon-Tyne 8. The erection of the building, the machines, and the installation costs represent an investment of £300,000 by the company to meet the growing demands of the steel industry.

The call for large rolls, in particular, is greater than ever before. Roll output, previously running at the rate of 10,000 tons (or approximately 2,500 rolls of various sizes) a year, is to rise by 20 per cent. as a result of the use of new machines. There will be a further increase when a high-precision grinding machine is delivered and work on foundry extensions is completed. Export business, representing about a third of the value of the company's sales of "Closeloy" cast-iron and cast-steel rolls and currently earning £500,000 a year, is likely to be enhanced, as well as home sales.

The new building is 270 ft. long by 70 ft. wide overall. The height to the apex of the roof is 54 ft., and of the walls to the eaves 37 ft. The walls are of brick up to a height of 10 ft. Elsewhere, apart from the glazing along the top of one wall and in the roof, the framework of the building is clad in steel. Heating is by means of gas radiant units suspended from the roof. The building has an overhead gantry crane supplied by Cowans, Sheldon & Company, Limited. Its rails are 240 ft. long, 60 ft. apart, and 27 ft. above floor level. The crane has a capacity of 50 tons and an auxiliary hoist capable of lifting 7½ tons.

The first machine to be installed in the new shop was a Craven 33¼-in.-centre heavy-duty roll-turning lathe. This came into operation in August, 1959. Driven by a 120-h.p. motor, it has three saddles, two of which are at the front and the other at the rear. Rolls up to 25 ft. long and 55 in. dia. can be turned in this machine, which has suitable speeds and feeds to enable both high-speed and tungsten-carbide turning tools to be used.

The next two machines to be installed began working in February, 1960. They are a Craven 40½-in.-centre heavy-duty roll-turning lathe and a Richards vertical borer. The Craven is as big as the largest lathe previously installed by the company, but its 150-h.p. motor is three times as powerful. It is therefore capable of faster output. This lathe can turn a roll up to 28 ft. long with a maximum diameter of 64 in. Like the 33¼-in. centre machine it has three saddles similarly disposed and provision for the use of high-speed steel and tungsten-carbide tools. In addition, it has means for cutting an internal screw thread in the end of a roll. The independent unit employed for this is synchronized with the main motor through Selsyn electrical gear. The Richards borer is a heavy-duty machine with two vertical rams and one side-cutting ram. It is employed for machining steel and cast-iron rollers, and has a table diameter of 6 ft.



A Craven Horizontal Miller for Machining Palm-end or Spade Drives on Large Rolls, which has been in Use by Armstrong Whitworth (Metal Industries), Limited, Gateshead, Since August, is Stated to be One of Only Two of its Size and Type in Britain.

The fourth machine has been working since last August. It is a Craven horizontal miller for machining palm-end or spade drives on large rolls. It can be adapted to mill both the side and end faces of a palm end, while a spade slot can be machined by attaching an overhead arm. These operations can be done with the roll remaining in the same setting, whereas before it was necessary to undertake them individually and transfer the roll. A face-milling cutter of up to 18 in. dia. can be used and there is a wide range of feeds and speeds. The machine is one of only two of its size and type in Britain.

The grinding machine, for the mirror-finishing of rolls for strip and plate mills, will be able to grind rolls of up to 40 in. dia. and 20 ft. in length. A Hercules product, it is being installed in one of the older roll-machine shops.

Accidents at Mines in 1960

THE following provisional figures of the number of persons killed and reportably* injured in coal, stratified iron, oil shale, and miscellaneous mines during 1960 are issued by the Ministry of Power.

Places or causes of accidents at mines producing coal	Number of persons killed. Inspection Division. Scottish.	Northumberland and Cumberland.	Durham.	North-Eastern.	North-Western.	East Midland.	West Mid and Shn.	South-Western.	Total 1960.	Total 1959.	Number of persons reportably injured. Inspection Division. Scottish.	Northumberland and Cumberland.	Durham.	North-Eastern.	North-Western.	East Midland.	West Mid and Shn	South-Western.	Total. 1960.	Total. 1959.
Underground—																				
Explosions of firedamp or coal dust	4	—	—	—	—	—	—	45†	49	16	6	—	—	—	—	—	—	2	8	5
Falls of ground	16	10	13	26	8	13	20	18	124	142	113	57	74	99	53	71	53	122	639	719
Haulage and transport	13	4	11	6	4	11	6	14	69	75	57	26	64	71	32	49	37	102	438	482
Miscellaneous (inc. shaft accidents)	12	6	2	8	4	6	1	6	45	93	50	17	27	61	20	55	27	43	300	305
Total	45	20	26	40	16	30	27	83	287	326	226	100	162	231	105	175	117	269	1,385	1,502
Surface—																				
All causes	5	1	4	6	2	7	3	2	30	22	22	10	21	33	13	18	17	51	185	174
Total, underground and surface	50	21	30	46	18	37	30	85	317	348	248	110	183	264	118	193	134	320	1,570	1,676

† All 45 persons in this category were killed in the disaster at Six Bells Colliery (Mon) on June 28, 1960.

Place or cause of accident	Mines of stratified ironstone, oil shale, or fireclay, and miscellaneous mines. Number of persons killed. 1960.	1959.	Number of persons reportably injured. 1960.	1959.
Underground—				
Explosions of firedamp	—	—	—	—
Falls of ground	3	4	7	12
Haulage and transport	—	—	4	4
Miscellaneous (including shaft accidents)	—	2	9	9
Total	3	6	20	25
Surface—				
All causes	—	1	4	3
Total, underground and surface	3	7	24	28

Cause of accident	Quarries. Number of persons killed. 1960.	1959.	Number of persons reportably injured. 1960.	1959.
Falls of ground	7	7	13	12
Blasting	2	—	8	6
Haulage and transport	16	10	27	26
Other causes	13	13	45	50
Total	38	30	93	94

* Injuries which, because of their nature or severity, are required to be reported to HM Inspectors of Mines at the time of their occurrence.

Fisher & Ludlow at Moscow Fair

PRODUCTS and equipment of the material handling and vending divisions will be shown by Fisher & Ludlow, Limited, Tipton (Staffs), at the 1961 British Trade Fair in Moscow.

Main exhibit of the material handling division will be the Flowmaster conveyor system. Included in the material handling display will be Fisholow-Hapman tubular conveyor, Flexiroll conveyor idler system, and Flowforge open steel flooring.

The upper deck of the Fisher & Ludlow stand has been designed as a lounge; vending machines will be demonstrated here and, in addition, there will be a small display of Fisholow stainless steel and vitreous enamel sinks.

Foreign Loans to Japanese Steel Industry

SUBSTANTIAL loans have been obtained from international banks in recent years by the Japanese steel industry. The British Iron and Steel Federation intelligence department reports that some $210,000,000 has been received since 1955.

In the immediate post-war years Japan's struggle to obtain credit with which to rebuild her industries found but little support abroad. It is only in the last five years that the increasing soundness of her economy has led to favourable consideration of her financial needs.

The steel industry, in particular, is having a notable success in gaining funds.

Fall in Demand "Temporary" Says John Summers' Chief

STATING that the company was at present having to restrict production, Mr. R. F. Summers, chairman of John Summers & Sons, Limited, said at the annual meeting last week that he believed the present falling off in demand was a temporary one, and it in no way affected his view that over the years there would be a steadily increasing demand for flat steel products.

MR. R. F. SUMMERS

"We are all set to take advantage of this, and I would hope as the present very heavy stocks of sheet are reduced, and the buying season for passenger cars approaches, we may see the beginning of an upward turn in demand." Mr. Summers recalled that in his chairman's statement, he had said that on paper the company's order-book was full, and that even if the whole of the increased capacity could not be used, he would be disappointed if deliveries were not up to the level of last year. Since then, the position had deteriorated somewhat.

This was disappointing, coming just at a time when the company was looking forward to a very substantial rise in output. Deliveries and provisional figures of profit for the current year so far showed satisfactory increases, but under the present circumstances it was impossible to make any forecast on the results for the full financial year.

Referring to the £18,500,000 scheme for the rebuilding of the Shelton Works, at Stoke-on-Trent, Mr. Summers said the project now had the sanction of the various official bodies and work on the site had started. It was hoped that a large part of the expenditure could be met from the company's own resources, but the extent of this would depend on trading results over the next three or four years. Arrangements for the immediate future of the scheme had been made with the company's bankers.

Mr. Summers told the meeting that it would be necessary to reduce the production of steel sheets at its Hawarden Bridge steelworks at Shotton, near Chester, by some 15 per cent. below the level of last year's production, because of the recession in the car and domestic appliance industries.

On Tuesday the company announced that because of the temporary slackening in demand for sheet steel, the majority of workers at the Hawarden Bridge steelworks were to work an average one shift a week less. About 12,000 people are employed at Hawarden Bridge, of whom about 10,000 are in the steel plant.

Restrictive Practices Court

CONSIDERATION of the common price agreement of the Cement Makers' Federation was concluded by the Restrictive Practices Court in London last Friday.

The court, which has to decide whether the agreement is in the public interest, reserved its decision.

The Scrap Markets

Steelmakers Maintain the Pressure

DEMAND for all steel-making grades has been well maintained, and supplies generally have been adequate to meet requirements by the mills. Pressure from the foundries for cast and heavy grade scrap has increased, with requirements in places difficult to fulfil. The market in the lighter weight material remains somewhat sluggish.

Cleveland—Supplies of raw materials are adequate to sustain maximum production of crude steel and pig-iron. Although works' stocks of ore and scrap are high, a steady stream of iron and other ore imports is maintained.

Steelmaking scrap is plentiful from home sources, while cast-iron and baled scraps for the foundries and blast furnaces are circulating freely.

Lancashire—Merchants report steady pressure for deliveries of steel-melting sorts and substantial tonnage is being absorbed by the mills. The position of cast scrap supplies is slightly more difficult than it was a short time ago.

Foundries are finding it less easy to cover their requirements and this is attributed largely to the fact that a much smaller quantity of textile machinery metal is coming on to the market.

Scotland—Business still has considerable ground to make up before it reaches the figures achieved in the last weeks of 1960. Deliveries of both steel-making scrap and turnings have been fairly well maintained, and no difficulty is presently experienced in disposing of the regular steel-making grades. Foundries seem to be a little better placed than they have been for some time past, and buyers are on the look-out for parcels of all suitable grades of cast-iron scrap.

South Wales—Merchants are still extremely active in endeavours to bring in all parcels of heavy grade scrap. There is a constant demand for this material, but the lighter-weight scrap is not moving at all. The market generally is alive, but not as active as has been the case for many months.

Imports of scrap material are not coming into local ports, but there is no shortage of any material. Steel makers and iron founders are still demanding supplies of heavy grade scrap.

STEEL INDUSTRY AND RESEARCH

POTENTIAL of most modern steel plants was much too low in proportion to costs, and "massive research" was needed to alter the situation, said Mr. H. F. Spencer, managing director of Richard Thomas & Baldwins, Limited, at the annual dinner of the Staffordshire Iron and Steel Institute in Wolverhampton. In far too many cases, said Mr. Spencer, members of the steel industry were "copyists." This would not guarantee the industry's competitiveness and leadership.

Mr. F. V. Wright, president of the Institute, said that £450,000,000 would be spent in development in the industry over the next four or five years. This was ample proof of the great prosperity which lay before it. Among the guests was Mr. Enoch Powell, Minister of Health.

In Parliament

NO "GENERAL" COAL SHORTAGE

Increased Production to Meet Heavy Demand

IN a statement on Monday, MR. JOHN C. GEORGE, Parliamentary Secretary to the Ministry of Power, said that there was no general shortage of house coal. On January 21, merchants' stocks were only a little lower than last year—1,060,000 tons against 1,180,000 tons. Demand by householders had been very high, but the National Coal Board had increased its output of large coal and, with the close co-operation of the railways, had been able to dispatch 12½ per cent. more house coal in the first 12 weeks of the winter than last year. These efforts would continue.

Replying to questions from MR. NORMAN DODDS (Lab.), and other members, MR. GEORGE added that supplies of solid smokeless fuels were adequate to meet requirements, although the Minister could not guarantee that a particular fuel would always be available in a particular locality. MR. PERCY BROWNE (Con.) said that in parts of the country there was a shortage. "In November the Minister told me that the board were making plans to increase the percentage of large coal mined. Are these steps bearing fruit?"

MR. GEORGE said the board conducted a campaign in the autumn and winter to try and raise the percentage of round coal, which was now 24 per cent. compared with 22.7 per cent. at this time last year.

Anthracite Supplies

Answering further questions, MR. GEORGE said that in the last few weeks, the Coal Board had taken steps to improve supplies of small anthracite to the domestic market. Coal operational arrangements were being adjusted to the long-term plans of the Coal Board for the supply of anthracite. These plans depended on the output of the new collieries at Cynheidre and Abernant, which began production at the end of last year, and which by next year should be producing between them 500,000 extra tons of anthracite.

Asked by MR. DODDS if he was satisfied, whatever the conditions now, that the railways would be able to co-operate sufficiently, and whether there was some method whereby road transport could be used more than it was, MR. GEORGE said co-operation between the Coal Board and the British Transport Commission was of a very high standard. Meetings were held weekly at which the position was reviewed. In the late autumn arrangements were made for handling coal by road transport, and substantial quantities were being moved by road by the Commission.

After further questions, MR. GERALD NABARRO (Con.) asked MR. GEORGE if he had noticed the number of complaints which had come from Midland towns, including Birmingham, Coventry, Wycombe, Shrewsbury, and others. Severe flooding had taken place in the Midlands, and the drying out of houses was one of the principal reasons for the exceptional demand for coal. "Is it not nonsense to say it is not a general or widespread shortage when manifestly it is? Why whitewash the Coal Board?"

MR. GEORGE replied that no amount of reiteration would turn a local shortage into a general shortage. In the first 12 weeks of the winter the board had increased dispatches of house coal by over 800,000 tons. The extra supplies had come from the successful drive for more large coal, a 50 per cent. rise in dispatches of house coal doubles, and from the screening of unscreened stocks. The amount of the board's stocks on January 21 was 460,000 tons.

Lower Coal Costs and the "Lull" in Nuclear Power

DURING a debate on nuclear power policy, MR. JOHN EDEN (Con.), said the Government had reached a "lull" in its programme, and he thought this was largely caused by the trend in the availability of conventional fuel, and also by the remarkable strides made in generating electricity through coal and oil, which had resulted in considerable reductions in capital costs and in improved efficiency in the operation of power stations. The present Calder Hall type of station would generate electricity at a cost per unit about 30 per cent. above that of the most advantageously sited coal-fired station. It was calculated, however, that by the beginning of the 1970's the cost of nuclear power would fall below the cost of conventional power at base load.

The country's energy needs were steadily increasing, he said, and to meet them, coal and oil would for a considerable time still be mainly responsible for supplying fuel to the bulk of the power stations in the country. But nuclear power would come to play an increasingly significant part, and according to one authority might account for 15 to 20 per cent. of the country's total energy needs by 1975.

MR. NICHOLAS RIDLEY (Con.), pointed out that the cost of the first five nuclear stations now being built would be £234,000,000 greater than it would had they been conventional power stations. MR. DAVID PRICE (Con.), said that one of the most important factors why the cost of coal and oil-fired stations had come down had been the remarkable technological improvements which had been made in conventional power stations.

VICE-ADMIRAL JOHN HUGHES HALLETT (Con.), who thought that the nuclear programme should have priority over investment in coal, and other types of conventional power, contended that it was not making the best use of the country's manpower to "condemn

the miners indefinitely to work far underground in an industry which is dirty, hazardous, and not particularly economic." A proper use of that manpower, he suggested, would be to bring them to the surface and let them go to jobs which would become available as cheaper power for nuclear power stations became available.

MR. JOHN C. GEORGE, Parliamentary Secretary to the Ministry of Power, said the Government accepted Mr. John Ridley's private motion, which urged the maintenance of the nuclear power programme at a level which would encourage development of manufacturing experience and capacity, and provide the best export prospects.

USE OF COAL AND OTHER FUELS

FIGURES comparing inland consumption of coal, oil, natural gas, hydro-electric and nuclear energy, in terms of coal equivalent, during the years from 1956 to 1960 were given by MR. JOHN C. GEORGE, Parliamentary Secretary to the Ministry of Power, in a written answer to MR. WILLIAM WARBEY (Lab.).

These were: 1956, coal (after adjustment for coke, etc., exported or put to stock) 214,100,000 tons, oil 38,000,000 tons, natural gas 20,000 tons, hydro-electricity 1,300,000 tons, nuclear electricity 30,000 tons; 1957, coal 207,700,000 tons, oil 37,200,000 tons, natural gas 30,000 tons, hydro-electricity 1,500,000 tons, nuclear electricity 200,000 tons; 1958, coal, 198,700,000 tons, oil 47,600,000 tons, natural gas 60,000 tons, hydro-electricity 1,400,000 tons, nuclear electricity 150,000 tons.

The figures for 1959 were: coal 186,900,000 tons, oil 56,100,000 tons, natural gas, 100,000 tons, hydro-electricity 1,400,000 tons, nuclear electricity, 600,000 tons; 1960, coal 197,000,000 tons, oil 65,600,000 tons, natural gas 100,000 tons (estimated), hydro-electricity 1,700,000 tons, and nuclear electricity 1,000,000 tons.

MR. GEORGE stated that inland energy requirements in 1961 might not be far short of 270,000,000 tons of coal equivalent, depending on the level of economic activity, weather and other factors, and might rise to about 300,000,000 tons of coal equivalent in the later 1960s. The shares of the various sources of energy would depend on their competitive ability.

GROUP APPRENTICESHIP SCHEMES

ASKED by MR. FREDERICK LEE (Lab.), how many group apprenticeship schemes were set up during 1960, and in which industries, MR. JOHN HARE, Minister of Labour, said five had been set up, four for engineering apprentices and one for commercial apprentices. MR. LEE said the general shortage of skilled labour was grave, and thought that if there was to be complete neglect by hundreds of small and middle-sized firms of the opportunity of joint schemes, some way should be devised to penalize them for this neglect.

MR. HARE agreed about the disappointing response, and said he was to attend regional conferences this week and next throughout the country under the auspices of the ITC and the Ministry of Labour to try to bring these problems home to people on the spot.

RAILWAY FOR SWAZI ORE

CONSTRUCTION of a railway from the iron ore deposits at Bomvu Ridge, Swaziland, to link up with the Portuguese East Africa system at Goba, to enable the export of the ore through Lourenço Marques, is "under active consideration" MR. HUGH FRASER, Under Secretary of State for the Colonies, said in a written reply to MR. H. A. MARQUAND (Lab.).

MR. FRASER said that the Bomvu Ridge deposits, the rights to which were held by the Swaziland Iron Ore Development Company, Limited, were estimated to contain 40,000,000 tons of ore with a grade of approximately 60-62 per cent. Fe.

GOVERNMENT POLICY ON RTB

WHEN MR. NICHOLAS RIDLEY (Con.), asked if the Government was yet in a position to sell back to the public Richard Thomas & Baldwins, Limited, MR. ANTHONY BARBER, Economic Secretary to the Treasury, said in a written reply that there had been no change in the decision, announced in October, to defer the sale of the company until its present developments were nearer to maturity.

MR. W. E. PADLEY (Lab.), asked when the debentures, loans and preference shares held by the Iron and Steel Holding and Realisation Agency were expected to be marketed; what estimate had been made of the likely loss to public funds, and would the Chancellor now postpone the operation? MR. BARBER said he could not discuss particular aspects of possible future operations by the Agency.

Asked further by MR. PADLEY what loss to public funds was estimated to be incurred by the forthcoming sale of the £40,000,000 debenture stock 1980-85 of the Steel Company of Wales, Limited, at present held by the Iron and Steel Holding and Realisation Agency, MR. BARBER again said he could not discuss the matter.

Yorkshire Mining Deputies Call for Wage Increase

RESOLUTION calling for wage increases for colliery underofficials, which was passed unanimously at the annual meeting of the Yorkshire Area council of the National Association of Colliery Overmen Deputies, and Shotfirers at Barnsley last weekend, will come before the national conference of the association when it meets at Cardiff in April.

Mr. L. Wormald, Yorkshire Area secretary, said the reason for the request for a rise was the advancement of other sections of the coal industry. His members considered that they should be paid according to their status and responsibilities. "These responsibilities are ever increasing as are the calls on us by the management which are necessary to maintain the higher efficiency the NCB has called for."

Mr. Wormald went on, "These increases will have to be paid if the board wants to retain and attract the right and proper people to supervise the industry." He added that the council had also expressed great concern about Saturday working talks which had been held without underofficials being consulted.

SUBSCRIBER SCHEME to help coal merchants, solid fuel appliance distributors, and appliance fixers with their window display problems has been launched by the Coal Utilisation Council. Full details are available from the publicity manager, Coal Utilisation Council, 3, Upper Belgrave Street, London, S.W.1.

OXYGEN PLANT to cost about £1,700,000 at Duisburg, West Germany, is planned by Knapsack Griesham, the Hoechst concern. It is to supply oxygen by pipeline to LD steelworks at Rheinhausen and Huckingen, to be built respectively by Hütten- und Bergwerke Rheinhausen, the Krupp concern, and by Mannesmann.

IRON AND STEEL TRADE

FIRST signs in a recovery in the car industry are beginning to appear but it will probably be some time before makers of sheet and strip feel any beneficial effect. Indeed, the full impact of the recession is now taking its toll in the steel industry in short time and temporary redundancy. Even on the heavy side of the industry, a slight fall in forward ordering of structural steel is causing some speculation. It may, however, stem from nothing more than the desire of some of the major consumers to reduce stocks to more normal levels.

Pig-iron

No difficulty is being experienced in obtaining all the pig-iron required, even though the demand for the low phosphorus irons and for hematite is still at a substantial level. The call for refined irons is reasonable, but by no means as great as that for the low phosphorus grades.

There is still a satisfactory oversea trade in the high phosphorus irons, but more than enough is available for export and for the home trade and makers are not achieving capacity outputs.

Ferro-alloys

The price of ferro-tungsten has been reduced a further 3d. per lb. to 11s. per lb. W contained. The price of tungsten metal powder is similarly reduced to 14s. per lb. The call on ferro-tungsten shows little change, however. Both ferro-vanadium and ferro-molybdenum are receiving steady attention.

Interest in the major grades of ferro-silicon continues at a good level, and both the low and high carbon grades of ferro-chrome are active. Calcium-silicide is in fair request and there is a good demand for ferro-manganese and silico-manganese.

Semi-finished Steel

Satisfactory outputs of small bars and light sections are maintained by the re-rollers and the pressure is still considerable for reinforcing rods. Apart from the latter the current level of demand shows a slight decline on previous figures and for hot rolled strip and bright steel bars business is now on a much-reduced scale.

Outputs of carbon and alloy steel semis are not as plentiful as could be wished but the re-rollers are well provided with mild steel semis.

Finished Steel

The rolling mills have full order-books for beams, joists, and sections and orders for plate are plentiful, though requirements are for gauges required by engineering and contracting firms rather than the heavier shipbuilding material. Capacity is still available for further orders for cold reduced sheets for reasonably quick delivery.

The same applies to an even greater extent to orders for good commercial quality bright bars, flat and corrugated galvanized sheets, and cold reduced strip and it is now possible to place business with the certainty of almost normal delivery dates.

"SAFETY AWARD" of the British Safety Council—one of the highest industrial safety awards in the country—has been awarded to R. N. Dodds & Sons, Limited, steel fabricators, A. Elliott (Electro Platers), Limited, and C. A. Parsons & Sons, Limited, engineers, etc., all of Newcastle-upon-Tyne.

New Installation for Hadfields

AFTER two years of extensive trials by its research and development departments to assess the benefits of processing high quality steels in consumable electrode furnaces, Hadfields, Limited, is to instal a large scale unit in its East Hecla works, Sheffield. This plant will be capable of producing vacuum melted ingots weighing from 2 to 9 tons and is expected to be in operation by September.

The consumable electrode vacuum melting process consists of melting in a vacuum a steel electrode previously made to a specified composition by a conventional process and re-forming the steel in a water cooled copper crucible. The new technique is said to offer substantial advantages over conventional air melting processes, including a greater degree of cleanness in respect of non-metallic inclusions, exclusion of contaminant elements associated with air-melting, removal of undesirable gases dissolved in the metal, improved uniformity, and soundness of the ingots and improvement in mechanical properties.

The equipment is being supplied by Stein & Atkinson, Limited, to the design of the Lectromelt furnace division of its American associate, the McGraw-Edison Company. A new building is being built to house the furnace which, it is believed, when completed will be the largest of its type in Europe.

ARMSTRONG WHITWORTH'S NEW ROLL FOUNDRY OPENING

REBUILT and enlarged heavy-roll foundry bay at Armstrong Whitworth (Metal Industries), Limited, Gateshead, is to be officially opened today (Friday) by Mr. Reginald Maudling, President of the Board of Trade, who will pour the first roll to be cast there. The company has increased its roll-production capacity by about 2,500 tons a year by completion of the bay.

Designed to produce rolls with a maximum cast weight of up to 55 tons, the bay is 220 ft. long and 55 ft. wide, with a 40-ft. high gantry for a 75-ton crane. It is the latest stage in the company's programme to increase roll production, and will be followed soon by the installation of a high-precision roll-grinding machine.

OUTPUT OF THE Italian steel industry increased by 21.7 per cent. last year. Production of raw steel amounted to 8,230,000 tons, against 6,762,000 tons in 1959. Pig-iron output was up by 28 per cent. to just over 2,000,000 tons. However, order-books in January were at a lower level than those of January, 1960.

Coalfield News

FOR MANY YEARS chief electrician at Rossington Colliery (Yorks), Mr. R. P. Bartlett has retired.

HAROLD LOCKETT CUP—awarded annually to the north Staffordshire colliery with the highest percentage of members of the National Savings movement—has been won by Victoria Colliery.

COATBRIDGE (Lanarkshire) Mine Rescue Station won the annual ambulance competition for the Motherwell & District Shield at St. Andrew's Ambulance Association headquarters in Glasgow on Saturday.

GOLD WRIST WATCH was recently presented by pit officials to Mr. B. J. Wood, for 4½ years undermanager of Glapwell No. 3 Colliery (Derbyshire). Mr. Wood is now undermanager of Arkwright Colliery, near Chesterfield.

FRAMED CERTIFICATE of the Society for the Protection of Life from Fire was presented to Mr. Arthur Cooper (56), a miner at Sharlston Colliery (Yorks), last Friday, for rescuing a motorist from a blazing car last June.

IN THE DONCASTER rural area, Mr. B. G. Wright, Don Valley youth employment officer, reports that the 34 boys who had taken jobs in coal mining since Christmas represented an increase in the number of school leavers entering the mines.

SENIOR first-aid competition held by the North Wales Area of the North-Western Divisional Coal Board was won by Ifton Colliery with Hafod Colliery as runners up. The Ifton team will now compete in the divisional finals at St. Helens in March.

HEAVY WEATHER delayed shipments of coal and coke from the South Wales ports last week, and the total shipment of 39,995 tons was the lowest since Christmas. It was 15,506 tons lower than the previous week, and 16,052 tons down on the same period last year.

HUNDREDS OF THOUSANDS of gallons of water from a disused mine near Pontypridd, burst on to the Pontypridd-Ynysybwl road last week. A brick wall sealing off an old level collapsed under terrific pressure and bou'ders, old pitprops and concrete pillars were hurled out of the shaft.

TOTAL of £11,608 was paid to dependants of the Creswell Colliery (Staffs) disaster fund last year, bringing the total amount distributed since the fund opened to £128,101. It is expected that some £9,645 will be paid out this year. At the annual meeting last week Cllr. E. L. Wood was elected chairman for 1961.

COMMENTING at Swansea on the report of HM Chief Inspector of Mines, Mr. T. A. Rogers, into the Six Bells Colliery disaster, Mr. D. D. Evans, general secretary of the South Wales Area of the National Union of Mineworkers, urged a national inquiry into the danger of falling stone or rock causing pit explosions.

EASTON COLLIERY recently won the annual junior ambulance competition of the Central East Area of the Scottish Divisional Coal Board, beating by eight points Polkemmet Colliery which has won the event ever since its inauguration. The individual award was won by an Easton Colliery miner, Mr. William Robertson.

ONE OF THE OLDEST pits in the country, Broomhill Colliery (Northumberland), closed last Friday. The first shaft was sunk there in 1808 and during the first world war the output was 2,000 tons of coal a day. In 1958 output had declined to 550 tons a day. The 400 miners who worked at the pit have been found alternative employment.

APPEAL to the Coal Industry Society Welfare Organization not to sell the luxury miners' club, Nivensknowe, Bilston, near Edinburgh, has been made by tradesmen, winding engine men, and boilermen from five pits in the area. Some time ago an Edinburgh restaurateur made a tentative offer of £100,000 for the club, which cost £120,000 to build.

FOR THE FIRST TIME in six years, coal and coke shipments from Sunderland (Co. Durham), showed an increase in 1960. Shipments were 2,209,583 tons, a total which would have been higher but for the seamen's strike in August and September. Imports last year through the Wear included 39,936 tons of iron and steel scrap, and 10,303 tons of pitprops.

VERDICT of Accidental Death was returned at the inquest on Mr. Charles Henry Whordley (54), who was killed by a runaway truck at Great Wyrley No. 3 Colliery (Staffs). The steel rope pulling the trucks at the pit snapped and a safety device failed to stop the runaways, but the Cheslyn Way coroner, Mr. D. F. Cave, found no indications of criminal negligence.

RECORD which had stood for 25 years for monthly coal shipments through the port of Blyth (Northumberland) was broken in January when the port shipped its biggest-ever tonnage of 678,443 tons of coal. In the past two months the weekly coal shipments record has been broken four times. Blyth is second only to Newcastle-upon-Tyne as Britain's largest coal exporting port.

OVERALL PRODUCTIVITY in the Durham Division of the NCB during the fourth week of the year was 23.14 cwt. per manshift against 22.11 cwt. in the corresponding week of 1960. At the face, productivity reached 65.74 (65.09) cwt. per manshift. In the first four weeks of the year, overall productivity averaged 22.79 (21.71) cwt. per manshift with 65.11 (63.85) cwt. at the face.

Campaign Cuts Accidents in Durham Coalfield

EFFORTS of pits in the Durham Divisional Coal Board during its campaign for greater safety resulted in the division's accident rate falling by eight points in 1960, compared with a standstill in the national rate. A competition organized by the board in connection with the campaign had two sections: one based on the lowest accident rate per 100,000 manshifts, which included all accidents causing more than three days incapacity, and another in which recognition was given to collieries having the largest reduction in accident rates during 1960, compared with the average for the previous two years.

The competition was divided in three classes: "A" (large collieries), "B" (medium), and "C" (small), and winning collieries in the divisional finals were: Lowest accident rate, "A," Boldon (No. 1 Area), "B," Langley Park (No. 5 Area), "C," North Tees (No. 4 Area); Best improvement, "A," Herrington (No. 2 Area), "B," Marley Hill (No. 6 Area), "C," Malton (No. 5 Area).

RECRUITMENT RISE IN WEST MIDLANDS NCB

MANPOWER in the West Midlands Divisional Coal Board decreased by only 27 to 43,000 in January, compared with a drop of 300 in January last year. The number of juvenile entrants was more than 50 per cent. higher than in the previous year and other new labour increased by about 80 per cent.

Output per manshift in the division was 93.6 cwt. at the coal face and overall 29.8 cwt., both of which created new records. During January the division's stocks of coal fell by 276,000 tons to 1,783,000 tons.

THE COAL TRADE

FROM a number of centres come reports of inconsistency in rail deliveries of coal and this is undoubtedly one of the primary causes of the difficulties merchants are experiencing in many parts in keeping abreast of the steady pressure for supplies. Industrial demand is maintained at a high level and by and large it is possible to give satisfaction in this sector. The call for any one type of premium smokeless fuel varies from place to place, but it is still difficult to get delivery at short notice and for anthracite in particular, it can be a matter of several weeks before an order can be fulfilled.

SOUTH WEST LANCASHIRE

Strong pressure for house coal continues and merchants are being heavily pressed by householders for prompt deliveries. While certain qualities are scarce the overall picture is not too bad as there are sufficient coal available at the depots to satisfy present needs, providing that householders accept whatever coal is offered. Continued shortage of labour is causing much difficulty in transport working. The demand for smokeless fuels, particularly Coalite and Rexco, is showing a steady increase and supplies are not keeping pace with the demand. Anthracite nuts, dry steam nuts, and Phurnacite all continue scarce, and small hard coke nuts are being offered as substitutes.

The coke market remains brisk with a strong demand for central heating purposes. There is a steady request for sized coke nuts for engineering purposes and supplies of both hard and gas coke are adequate for present requirements. Industrial demand for other types of steam raising fuels is also strong.

The average retail prices per ton of house coals are:—Group 1, 212s. 8d.; Group 2, 193s. 3d.; Group 3, 176s. 5d.; Group 4, 164s. 8d.; Group 5, 151s. 7d.; Group 6, 141s. 5d.; Group 7, 127s.

Demolition of Coal Exchange Stayed

DEMOLITION of the Coal Exchange in Lower Thames Street, City of London, has been delayed so that its future may be debated in the House of Commons. The "reprieve" was announced to the Court of Common Council on Thursday of last week by Mr. R. Stephens, chairman of the Coal and Corn and Finance Committee, who said the committee's recommendation for demolition had been withdrawn for four weeks.

This decision followed a letter received that day from the Minister of Housing asking that the committee's report be "temporarily shelved" pending a debate in Parliament asked for by Mr. Tom Driberg, Labour MP for Barking.

The Royal Fine Art Commission wants to preserve the 112-year-old Coal Exchange for its architectural and historic interest. The council considers demolition urgent because of the proposed widening of Lower Thames Street.

Mr. JOHN THOMAS TAYLOR, who had spent nearly all his working life at Sneyd Colliery (Staffs), has died at the age of 74.

Coal Stocks Back to Pre-crisis Level

IN the last week of January nearly 600,000 tons of coal were lifted from stock. In the last quarter of 1960 stocks were being lifted at a rate of just under 400,000 tons a week. During the last five weeks this has increased to more than 500,000 tons a week, reducing the total stocks in the country to 27,000,000 tons, compared with over 34,000,000 tons in the same period of 1960. This is the lowest level that undistributed stocks of coal have reached since the large-scale stocking began in July, 1959.

There were 583,240 wage-earners on colliery books on January 28, against 629,280 on January 30, 1960, the numbers engaged at the coal face being 219,670 and 240,830 respectively. Total absenteeism (all workers) in the week ended January 28, was 17.05 per cent., compared with 14.52 per cent. in the week ended January 30, 1960. Output at the face was 4,093 tons and overall 1,436 tons in the week ended January 28, compared with 3,891 and 1,386 tons in the week ended January 30.

The following table gives (in tons) the revised output of saleable mined coal by division in the week ended February 4, and the tonnage lost through all causes (holidays, disputes and go-slows):—

Division.	Week ended February 4, 1961.		Week ended February 6, 1960.
	Total output.	Tonnage lost.	Total output.
Scottish ..	346,000	10,000	376,000
Northern (N&C) ..	243,000	—	243,000
Durham ..	469,000	—	471,000
North-Eastern ..	775,000	4,000	866,000
North-Western ..	243,000	2,000	278,000
East Midlands ..	856,000	6,000	932,000
West Midlands ..	278,000	1,000	298,000
South-Western ..	374,000	2,000	410,000
South-Eastern ..	33,000	—	33,000
Great Britain—			
Deep-mined coal ..	3,617,000	25,000	3,907,000
Other deep-mined (including licensed mines) ..	40,000	—	53,000
Open-cast coal ..	141,000	—	147,000
TOTAL	3,798,000	25,000	4,107,000

SITE INVESTIGATION for the Greenock Great Harbour scheme is being carried out by the soil mechanics section of the Cementation Company, Limited. Of the 37 boreholes which are to be sunk, 22 are being bored from floating craft. Average depth of the boreholes is 70 ft.

Mr. W. D. Pugh Visits Australia

MANAGING director of the English Steel Corporation, Limited, Sheffield, Mr. William D. Pugh left by air on Sunday for a business trip to Australia. He will visit English Steel customers and agents and also attend the opening of the company's subsidiary, English Steel Corporation Tools, Pty., Limited, at Dandenong, near Melbourne.

MR. W. D. PUGH

The opening ceremony will be performed by the Prime Minister of Victoria, Mr. H. E. Bolt, on February 23. The factory covers 16,400 sq. ft. and will produce twist drills and ground thread taps.

Mr. Pugh is also chairman of Darlington Forge, Limited, and managing director of English Steel Forge & Engineering Corporation, Limited. He is a director of a number of companies connected with the steel industry including Firth-Vickers Stainless Steels, Limited, High Speed Steel Alloys, Limited, and Taylor Bros. & Company, Limited.

Ore Chartering

WHILE activity on the part of the Chinese has had the effect of steadying the prompt market position, it does not appear to have had any marked effects on long distant markets generally. In fact, from certain areas there is no evidence of any particular firm undertone. Although there is still quite a good inquiry on the Indian market, Continental charterers are not pressing unduly and Marmagoa/Japan reports 9,500 tons for early loading at 46s. f.i.o., and 8,000 tons Vizagapatam to Antwerp at 59s. f.i.o. and trimmed for the middle of February.

There has been some movement from the Mediterranean area. La Goulette/Poland fixing 10,000 tons for February at 21s. 6d. f.i.o., Porto Marghera to Rotterdam or Dordrecht 5,500 tons prompt at 31s. f.i.o. and trimmed, and about 2,700 tons of burnt ore to Middlesbrough at 31s. on same terms. Savona/Bremen reports 5,100 tons for February at 25s. also f.i.o. and trimmed, and Poti manganese to Rotterdam 32s. 6d. f.i.o. for 10,000 tons prompt. Narvik reports further fixtures to Gdynia or Gdansk for February at 13s. f.i.o. for tonnage of about 12,000 tons.

In the pyrites section, Morphou Bay/Immingham has taken 6,500 tons for the second half of February at 38s. 6d., 14,000 tons to Dunkirk for early February at 29s. 6d., and 7,500 tons to Ghent at 30s. prompt. Casablanca phosphate to the UK is quiet, but a 14,000-tonner for the middle of February loading has been fixed from Tampa to Immingham at 44s. 9d. on gross terms.

US Combine to Study Nigerian Steelworks Plan

APPROVAL has been granted by the Federal Government of Nigeria to a plan by an American consortium to investigate the feasibility of establishing a £16,000,000 iron and steel combine in Nigeria. The consortium has been given a year in which to carry out a detailed study, prepare plans and specifications, and propose the capital structure for such an industry.

When a team of experts has finished its work its findings will be correlated with all known processes for the manufacture of iron and steel so that the site of the industry and type of plant used would be tailored to the Nigerian economy. It is envisaged that a Nigerian company would run the plant, making provision for equity participation from Nigerian sources, but drawing most of its capital from US organizations.

RHEINSTAHL SELLS HOLDING IN HANDELSUNION

WEST GERMAN steel concern Rheinstahlwerke has sold its 25 per cent. holding in Handelsunion, AG, the country's biggest steel trading company, thus honouring an obligation imposed by the industrial deconcentration order after the second world war. The buyer has not been revealed, although it is reported to be a Swiss group.

August Thyssen Hütte, AG, which already holds about a quarter of the Handelsunion equity, recently lodged an application with the High Authority of the European Coal and Steel Community to be allowed to increase its holdings to over 50 per cent.

Finnish Iron-smelting Project's Progress

PROGRESS continues in the planning of the new iron-ore smelting works in Finland. The company established for the project, Rautaruukki Oy, is 75 per cent. State owned, with the rest of the capital in the hands of four private companies in the heavy engineering sector. The original scheme, submitted by a West German firm, has now been enlarged. The smelting works is only the first stage, scheduled for completion in 1963-64. The second stage will be a steel mill, and the third a rolling mill for medium and thick plate.

The smelting works is expected to have an output of 300,000 to 350,000 tons of raw iron a year. It will be fed with about 500,000 tons of iron ore from three Finnish mines, one now producing, one to be opened next year, and a third in two years' time.

A member of the board of Rautaruukki stated that it is impossible to estimate the total cost of the project, but the figure of Fmks. 30,000,000 has been mentioned. Parliament recently voted Fmks. 500,000,000 for dredging the harbour for the new iron works, which will be at the port of Raahe on the north-west coast of the Gulf of Bothnia.

There has been speculation about the possible use of Soviet credit for 500,000,000 (old) roubles to finance the scheme, but local experts have suggested that Soviet blast furnaces would not be suitable for Finnish conditions. This was denied by a director of the company, who said, however, that no decision had yet been taken on the award of contracts.

ARTHUR LEE & SONS, LIMITED—Mr. W. C. Long has retired from the board.

TUC Coal Plea Fails

OUTPUT GUARANTEE REFUSED BY GOVERNMENT

LEADERS of the Trades Union Congress failed to persuade the Prime Minister last week to agree that the Government should guarantee an annual coal production of 200,000,000 tons in order to create confidence among miners in the future of the industry. Mr. Macmillan told the deputation at a private meeting that he could not give such an undertaking, but promised to bear in mind their request, and other points made about a co-ordinated fuel policy, and oil and methane imports.

Main purpose of the talks was the problem of dwindling manpower in the industry. The TUC drew attention to the number of men leaving the industry—"some hundreds each week"—and said that unless confidence could be restored, mining would go through the same experience as the textile industry, where, in spite of capital investment, not enough workers could be found to man the machinery.

It is believed that the TUC would like a specific undertaking that the Government should either pay for stockpiling of coal if demand fell below the 200,000,000 tons mark, or some limitation on oil imports to raise demand for solid fuel.

Premier's Arguments

Mr. Macmillan's main argument was that Government policy had not been motivated alone by economic pressures, but had also been influenced by humane consideration, and he thought that the National Coal Board had done a great deal for the industry and those employed in it.

He referred to the rapidity of technological change, which made it difficult to give an undertaking based on prevailing circumstances to any industry. There might be a new "breakthrough" in the field of nuclear energy, which would make a guarantee of keeping to the figure of 200,000,00 tons unrealistic. He also pointed out that other industries might seek guarantees for themselves if the Government showed it would underwrite the coal industry.

On the question of oil, the Prime Minister maintained that Britain was on balance a fuel exporting nation, and that its shipments of refined oil played a part in the balance of payments problem. The trade unionists felt that this was open to argument, but had no statistics at the time with which to challenge it.

The delegation raised a number of other questions which they had previously raised with successive Ministers of Power—the need for a co-ordinated fuel policy, the import of methane gas, and the desirability of power stations using coal if they were equipped to do so.

The discussion was attended by Mr. Selwyn Lloyd, Chancellor of the Exchequer, Mr. John Hare, Minister of Labour, and Mr. Richard Wood, Minister of Power. The six members of the TUC production committee, which was headed by its chairman, Mr. L. Wright, included Mr. Will Paynter, general secretary of the National Union of Mineworkers, and Mr. Ted Hill, chairman of the TUC.

SIX BELLS COLLIERY Disaster Fund now stands at over £102,130.

"Massive" Mechanization Drive in the Mines

"WE intend this year to have a massive drive—the biggest drive ever—for mechanization, for we are determined this industry will be an asset to the nation," Mr. John C. George, Parliamentary Secretary to the Ministry of Power, told a meeting of women Unionists in Glasgow on Saturday. He believed that coal would see most of its troubles behind it by 1962. "To achieve this will mean concentration in good pits and cutting out manpower where it can be done away with. Everything will be done quickly to ensure this industry—the biggest employer of labour in a single industry in the whole world—becomes a real asset," he maintained.

Mechanization of the mines would mean less house coal, he said. "With a little luck we will get through without any general shortage, but gradually the use of house coal will diminish. We are not going fast enough and if we are to look after house coal we can't go as fast as we want to go if we are to get out of the red."

Referring to the criticism levelled at the industry for stockpiling coal to the present level of 27,000,000 tons—which, he pointed out, "prevented miners being thrown on the scrap heap"—Mr. George said that it looked as if the stocking of coal would turn out to be a good investment. "The normal stock is 8,000,000 tons and we will probably lift another 6,000,000 or 7,000,000 tons next year," he said.

By 1965, 80 per cent. of the coal mines in Britain would either be new or completely reconstructed and the other 20 per cent. in first-class condition. "We are now in the position where output has been brought down to below demand. There is no longer any fear of a massive close-down of collieries and unemployment in the mines," he said.

BRYNLLIW COLLIERY

COST of the reorganization of Brynlliw Colliery was given incorrectly in the introduction to the article on "Anthracite Mining in South Wales" in last week's issue (p. 237).

The cost of the entire project was £4,500,000.

INDUSTRIAL TRACTORS with mounted diggers and shovels, worth £100,000, have been ordered by the East German Republic from Massey-Ferguson, Limited, Coventry. It is the company's first major order from this area.

First Director for MTIRA

FIRST director of the newly-formed Machine Tool Industry Research Association, Mr. A. E. De Barr, will take up his full-time duties on April 1. Mr. De Barr, who is 42, is at present head of the Spinning department at the Shirley Institute, the British Cotton Industry Research Association's laboratory at Manchester. He was previously in charge of the physics division of Elliott Bros. (London), Limited, Boreham Wood (Herts).

Mr. De Barr's experience covers a wide range of research and development, including control of activities involving fundamental research on basic mechanical processes and control systems.

The MTIRA was incorporated last December following the publication of the Mitchell Report and steps are now being taken to find a permanent headquarters. This is likely to be in the provinces, near one of the heavy concentrations of the machine-tool industry.

Membership application forms are now going out to the 100 or so firms who gave the Machine Tool Trades Association signed undertakings to support the research project for a minimum of five years. There is every ground, says the MTIRA, for hoping that full recognition will be given by the Department of Scientific and Industrial Research, especially in relation to financial support.

Higher Turnover by VOEST: New Expansion Plans

NATIONALIZED Austrian steel concern, Vereinigte Osterreichische Eisen- und Stahlwerke, AG, (VOEST), of Linz, made a turnover in 1960 of over 6,000,000,000 schilling, compared with 4,700,000,000 schilling in 1959. Of the 1960 total, 5,600,000,000 schilling resulted from operations at the company's main works at Linz. About 3,200,000,000 schilling resulted from export sales.

During 1958 and 1959, 862,000,000 schilling was invested in expansion programmes by VOEST, and the concern is planning a number of projects for the future. Work has begun on a profile and tube rolling mill at the group's Krems plant. By 1962, capacity for cold-rolled sheet will be doubled to 400,000 metric tons a year, and overall rolling capacity will later be raised by 500,000 tons a year. Raw steel capacity will be increased during the same period to 2,300,000 tons a year. Output figures for 1959 were 1,400,000 tons of raw steel, and 900,000 tons of rolled products.

Administrative changes are also to take place. The Krems plant, which has been controlled by VOEST for five years, is to become a wholly-owned subsidiary, as is the Viennese steel construction company, Wiener Brückenbau, AG. The Grünbach and Langau coal-mining concerns are to be formed into one company, which will also become a wholly-owned subsidiary.

Anglo-US Aluminium Group Income Up by 70 Per Cent.

INCREASE of 70 per cent. in the combined income of the British Aluminium Company, Limited, and Reynolds-T.I. Aluminium, Limited, is reported for the year ended July 31, 1960, by Mr. R. S. Reynolds, Jnr., president of the Reynolds Metal Company, US.

Earnings, before taxes, were $11,900,000 for the two companies, compared with approximately $7,000,000 a year ago.

Members of UK Advisory Committee on Education Named

DRAWN from management and technical institutions, from industry and the professional bodies, the 31 members of the United Kingdom Advisory Council on Education and Management were announced by the Minister of Education last Friday. The council's chief responsibilities will be to keep under review the provision made for management education in technical colleges and to maintain contact with other bodies providing such education. It held its first meeting on Monday.

The council will be under the chairmanship of Mr. J. W. Platt, director of the Shell Transport & Trading Company, Limited. Among the members are Mr. K. S. Arnold, managing director of Duncan Stewart & Company, Limited; Lt.-Col. L. F. Urwick, chairman of Urwick Orr & Partners; Mr. P. C. Ashton (nominated by the Federation of British Industries), chairman of Betts & Company, Limited; Mr. J. O. Blair-Cunynghame, a joint deputy chairman of the Royal Bank of Scotland, Limited, and former staff member of the National Coal Board.

Mr. F. G. C. Cutcliffe, head of the education department of the British Institute of Management; Mr. W. W. Fea, financial director of Guest, Keen & Nettlefolds, Limited; Col. B. H. Leeson, chairman of the Electrical and Electronic Manufacturers' Joint Education Board; Mr. C. A. Roberts, member for staff of the National Coal Board; Sir Ewart Smith, former deputy chairman of Imperial Chemical Industries, Limited; Mr. R. H. S. Turner, director and works manager of Associated Electrical Industries (Manchester), Limited.

Dr. E. G. Edwards, principal of Bradford Institute of Technology; Prof. C. Macrae, head of the industrial administration department of the Royal College of Science and Technology, Glasgow; Dr. O. G. Pickard, principal of Ealing Technical College; Dr. J. E. Richardson, principal of the Regent Street Polytechnic; Dr. F. B. R. Venables, principal of the College of Advanced Technology, Birmingham.

"Wide Experience" Necessary to Colvilles' Board

AMID applause, Mr. Harry Yates was re-elected to the board of Colvilles, Limited, at the annual general meeting in Glasgow last Friday. Earlier a shareholder, who declined to give his name, questioned the necessity of re-electing Mr. Yates, who is 81, to the board.

Sir Andrew McCance, chairman, said that the retention of Mr. Yates' services was desirable. The company was starting on a new and enlarged steel production scheme. It would be manned by young men of enthusiasm and skill, but it was necessary to retain the wide experience of Mr. Yates in the sheet steel trade so that he could pass that knowledge on.

RESIDENTIAL COURSE for business managers is to be held by Edinburgh University from July 1-22. It is intended for managers likely to be taking senior positions and aims to develop a broader understanding of business problems and the environment in which business operates. Details of the course, which costs 90 gns., are available from Prof. N. C. Hunt, Department of Commerce, University of Edinburgh.

Company News

INCANDESCENT HEAT

£1,300,000 Bid by Wellman Smith Owen

BID worth £1,330,000 has been made by the Wellman Smith Owen Engineering Corporation, Limited, for the Incandescent Heat Company, Limited, furnace manufacturers, founders, and general engineers, of Smethwick, Birmingham. The offer is 129s. cash or one 5s. Wellman ordinary share plus 84s. cash for every four of Incandescent Heat's 824,895 ordinary 4s. shares. The directors of Incandescent Heat, who own more than 40 per cent. of the shares, recommend acceptance.

The new Wellman shares will rank for the final dividend for the year ending March 31, 1961, which the directors expect will not be less than 15 per cent., the same as last year. The business of Incandescent Heat is largely complementary to that of Wellman Smith Owen and covers a wide range of thermal engineering throughout the metallurgical, chemical, foundry, and other industries.

The merger will broaden the field of activities of both companies, it is stated, and enable them to offer the combined technical research, development, and manufacturing facilities of the new group throughout the entire field of furnace design and construction. It is intended that Incandescent Heat shall continue to operate as an autonomous unit.

If the offer becomes unconditional, Mr. John Fallon, chairman of the Incandescent group, will be invited to join the Wellman board, and Sir Peter Roberts, chairman of the Wellman group, will be invited to accept office as vice-chairman of the Incandescent group. Wellman Smith Owen will require to increase its share capital to implement the offer and for this purpose an extra-ordinary meeting is being convened.

CAPE ASBESTOS COMPANY, LIMITED—The outstanding ordinary shares in Small & Parkes, Limited, are to be acquired compulsorily.

TAP & DIE CORPORATION, LIMITED—Interim dividend is raised by 1¼ per cent. to 7½ per cent. Last year's total dividend of 20 per cent. included a 2½ per cent. bonus.

VULCANITE, LIMITED, makers of roofing felts and dampcourses, of Stranmillis, Belfast—The directors are considering bringing the capital more into line with the value of the company's assets by way of a bonus and/or a rights issue of shares.

INSTANT STARTER ENGINEERING, LIMITED—Group net loss for the year to June 30, 1960, was £1,279 (loss £601). The directors are hopeful of the future of the company, but do not wish to say more pending receipt of advice on major matters. This will be some time ahead as the situation is a complex one.

BOULTON PAUL AIRCRAFT, LIMITED—All the capital of Accurate Screw Threads, Limited, Hednesford (Staffs), has been acquired from the Sheffield Twist Drill & Steel Company, Limited. Last month the Dowty Group, Limited, made an offer for the ordinary capital of Boulton Paul Aircraft.

I. L. BERRIDGE & COMPANY, LIMITED—The acquisition of the company by Alfred Herbert, Limited, has been completed. The subsidiary and associated companies, together with the Whetstone factory have, as agreed, been sold to C. S. Martin (Holdings), Limited, and C. S. Martin, Limited.

STEEL & COMPANY, LIMITED—Nearly £1,000,000 is to be raised by a rights issue of 1,000,000 5s. ordinary shares at 19s. each on a basis of one-for-six to holders of February 6. The new shares will rank for the final dividend for the 52 weeks to March 26, 1961, which the directors expect will be at last year's rate of 10 per cent.

SIEBE, GORMAN & COMPANY, LIMITED, manufacturers of safety equipment and respirators, of Chessington (Surrey)—An offer has been made for the whole of the issued share capital of C. E. Heinke & Company, Limited, manufacturers of rubber mechanical components and breathing apparatus, of London, S.E.1. The directors of Heinke have accepted the offer in respect of their own holdings and recommend holders to accept.

W. J. BUSH & COMPANY, LIMITED, manufacturers of industrial chemicals, of London, E.8—Offer worth £8,500,000 has been made for the entire £2,250,000 capital by Albright & Wilson, Limited. Terms are 10 Albright & Wilson 5s. ordinary shares for every three £1 ordinary shares, plus 4s. cash per share and 10 Albright & Wilson ordinary for every 3 "A" ordinary shares. For every 10 5 per cent. £1 preference shares 11 Albright & Wilson 5 per cent. £1 preference shares are offered.

B.T.R. INDUSTRIES, LIMITED—Group sales for the first three months of the current year are well up on those for the corresponding period of last year, although sales have fallen short of expectations in some sections. Profits, before tax, for the year ended October 1, 1960, were £893,878 (£579,135). Demand by the National Coal Board for PVC fire-resistant belting continued to be substantial. The sales of rubber belting increased by about 20 per cent., reflecting the increased activity of the capital equipment industries.

E. SHIPTON & COMPANY (HOLDINGS), LIMITED, electrical and mechanical engineers, of Northwood Hills (Middx)—No dividend is to be paid for the 18 months' period to September 30, 1960, against a total of 22½ per cent. for the previous year, but as "a mark of confidence" in the group's prospects, an interim of 10 per cent. is to be paid in respect of the current year. A trading loss of £35,045 (profit of £36,276) was made in the 18 months' period. With a view to expansion, the borrowing powers are to be increased by £500,000.

MITCHELL, SHACKLETON & COMPANY, LIMITED, crankshaft makers and forgemasters, of Manchester—Referring to the fall in net profit to £85,898 (£86,994) for the

year to September 30, 1960, Mr. Joseph Mitchell, chairman, states that orders for the heavier side did not show signs of improvement until late in the financial year. The order-book is now in a very much improved position, and while much depends on the recruitment of adequate suitable labour, prices will have to be increased to compensate for higher costs.

EXPERT TOOL & CASE HARDENING COMPANY, LIMITED—Cash offer of 2s. 9d. for each of the 2s. shares has been made by the Northern Mercantile & Investment Corporation, Limited. The directors have recommended acceptance. If the bid gains 90 per cent. acceptance, the purchasers will pay the arrears of the preference dividend from July 1, 1958, and will continue the business of the group. Mr. Sydney Newman and Mr. Raymund Ball have agreed to resign from the board. Mr. Angus Murray and Mr. W. G. F. Westbrooke will continue as directors.

VENNER, LIMITED, electro-mechanical engineers, of New Maldon (Surrey)—In order to continue with the expansion programme it is proposed to issue 432,000 ordinary 5s. shares by way of rights in the proportion of one new share for every three stock units held. It will be necessary to increase the authorized capital from £380,000 to £550,000 by the creation of 580,000 ordinary 5s. shares. The year ending July 31, 1960, was the company's jubilee year and the net profit rose to £56,373 (£34,483), after tax of £55,541 (£26,413). The dividend is 13 (7) per cent. on increased capital.

ASSOCIATED COMMERCIAL VEHICLES, LIMITED—The whole of the issued share capital of 750,000 £1 ordinary shares of Transport Equipment (Thornycroft), Limited, is to be acquired. The company is a wholly-owned subsidiary of John I. Thornycroft, Limited, shipbuilders and repairers, and iron and brass founders, etc., of London, S.W.1, and comprises of all that group's road transport and automotive diesel engine manufacturing and selling interests. The consideration is 150,000 fully paid £1 ordinary ACV £1 shares, ranking *pari passu* with the present share capital, and £1,000,000 in cash to be paid over two years.

BAKER PERKINS, LIMITED, manufacturing engineers and iron and non-ferrous founders, of Peterborough—To re-finance the purchase of a number of businesses during the past year a rights issue of 871,296 £1 ordinary shares at 36s. each is to be made on the basis of seven shares for every £25 ordinary stock held on January 24. The issue is expected to raise £3,000,000. The directors expect to recommend a final dividend of 8¾ per cent. on the present capital making 11¼ (8) per cent. for 1960, against a forecast of 10 per cent. The offer for Rose Bros. (Gainsborough), Limited, has now been accepted in respect of the whole of the capital.

Butterfield Group Changes

FOLLOWING the capital reconstruction of W. P. Butterfield, Limited, Bradley & Company, Limited, and their subsidiaries, a number of board changes have been made. The directors of the parent company are now:—Mr. C. Butterfield, president; Mr. A. J. Butterfield, chairman; Mr. W. P. Butterfield and Mr. R. H. Butterfield, joint managing directors; Mr. T. L. Perry, financial director. The secretary is Mr. J. K. Williamson.

The board of W. P. Butterfield (Engineers), Limited, the company formed to operate the manufacturing undertaking at Shipley (Yorks), now comprises:—Mr. W. P. Butterfield, chairman; Mr. J. C. Butterfield, managing director; and Mr. Williamson, Mr. J. C. Dudgeon, Mr. G. P. Mosby, and Mr. H. Dermo, with Mr. E. G. Green as secretary.

Law Cases

PROP-SETTING DEVICE ACTION

AFTER a case lasting five hours, Doncaster County Court dismissed a claim by Mr. William Sanderson (58), a miner, for £400 damages for personal injury for alleged breach of statutory duty and/or negligence by the National Coal Board. While using a special type prop with an extension piece set by means of a ratchet device at Yorkshire Main Colliery, Mr. Sanderson trapped his hand when the extension dropped.

Mr. Horace Gregson, a member of the Institute of Mining Engineers, told the court that the device was well designed, useful, and clever, but, he said, if the downward pressure on the ratchet handle was too strong it could cause the extension to slip. For the board, Mr. J. B. Derby said that it would be difficult to design any machine which would be completely foolproof and which could not be abused. There had been a very high degree of negligence by the plaintiff, he maintained.

Finding that the board had not been guilty of breach of statutory duty or negligence, Judge A. J. Flint commented: "If necessary I should have found and been drawn to the conclusion that the plaintiff himself was wrong in failing to follow the system which had been followed throughout and which the overman had done his best to enforce." He awarded judgment and costs to the defendants. Special damages of £106 17s. had been agreed.

£10 FINE FOR "DARK SMOKE"

FINE of £10 was imposed on Sanderson Bros. & Newbould, Limited, steel, saw, file, etc., manufacturers, of Sheffield, which pleaded Guilty to an offence under the Clean Air Act of allowing dark smoke to escape for 16½ minutes in a half hour period.

Three factors were responsible for the firm emitting dark smoke from its chimney, Mr. Thornton W. Lambert, representing the firm, told the Sheffield magistrates. A quantity of scrap oil had been thrown on coal which was fed into the furnace; the foreman working the boiler was off with influenza, and an inexperienced man had taken his place; and the alarm which warned when smoke was emitted was out of order.

PIT UNDERMANAGER FINED

FOR having part of a cigarette in his possession while underground at Woodhorn Colliery (Northumberland), James Jacques, an undermanager, was fined £10 at Ashington Court. Evidence was given that Jacques, while talking to a colliery deputy, pulled a notebook from his overall pocket and a cigarette end fell out.

Jacques said he had not known that the cigarette end was in his pocket, and he had reported the incident himself to the colliery manager. It was stated that Jacques had previously held posts as pit safety officer.

CASE which opened at Port Talbot Magistrates' Court a fortnight ago in which three men were charged jointly with conspiring together to steal more than 1,450 tons of steel plate and joists worth £66,000 from the Steel Company of Wales, Limited, was resumed on Tuesday and adjourned after a six-hour hearing until today (Friday).

HEARING of a claim by Mr. Thomas Raymond Francis (36), a former ropeman at Hafodrynys Colliery, for damages from the National Coal Board for injuries received in an accident at the colliery, was adjourned by Judge Rowe Harding at Backwood (Mon) County Court. It was stated that special damages of £72 had already been agreed.

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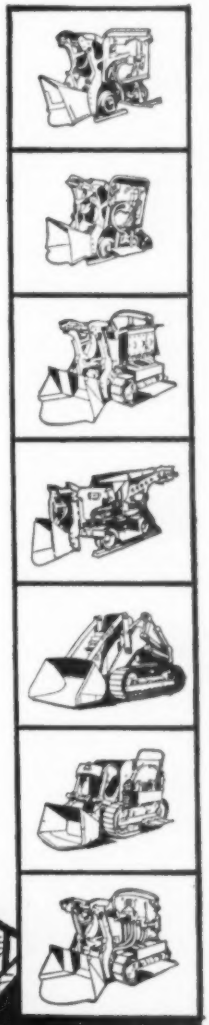

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NEWS IN BRIEF

SKODA WORKS, largest single unit in the Czech heavy engineering field, has announced expansion and modernization plans for the period up to 1965. The plans particularly affect smelting and forging works.

PURCHASE of Polish coal is reported as one of the topics being discussed in trade talks between West Germany and Poland. An import quota of 400,000 metric tons of Polish coal a year operates at present in West Germany. Ruhr coal mining interests are also stated to be seeking a barter deal of German coke for Polish coal.

BRITAIN'S TRADE with China last year reached the record level of £57,000,000, compared with £7,500,000 in 1952 and £27,000,000 in 1957. China bought from Britain nearly £6,000,000 worth of iron and steel, and over £3,750,000 worth of electric and other machinery. Value of tractors sent to China from the UK since 1956 has reached nearly £2,500,000.

BOARD OF Harpener Bergbau, AG, West German coal mining company, is likely to pay a dividend for the year 1960, it is stated. No dividend has been paid in the previous two years. Pithead stocks of coal and coke were reduced from 1,100,000 tons to 900,000 tons, and rationalization resulted in output per shift at the coal face being increased by 17 per cent.

EXPORTS by the British electronic industry are now five times what they were 10 years ago, despite strong competition from Germany, the US, and Japan, said Mr. L. T. Hinton, chairman of the Electronic Engineering Association. The estimated gross output of the capital goods side of the industry is now about £175,000,000—an increase of 150 per cent. in 10 years.

SECOND BATTERY of 26 coke ovens at the new works at Greatham, near West Hartlepool, of the South Durham Steel & Iron Company, Limited, was started up recently by Mr. T. J. Williams, a director and general manager. The first battery of ovens started in July, and a third is nearing completion which will bring the total number of ovens in operation up to 78.

NEW COMPANY, Lorforge, Société Lorraine de Forgeage, has been formed jointly by two French steel companies, Compagnie Française de Métaux, and Société des Aciéries de Pompey, to carry out operations formerly executed by the forgings and pressings departments of the two companies, and to operate a new plant to be built at Pompey, near Nancy, close to the steelworks of the Pompey concern.

REPORT THAT the Dominion Steel & Coal Corporation, Limited (Dosco), controlled by A. V. Roe, Canada, Limited, would be a partner with European interests in a $300,000,000 steel complex to be built at Contrecoeur, Quebec, was "completely false," said Mr. Albert Fairley, jnr., president of Dosco. The corporation still had plans, however, to build a rolling mill at Contrecoeur some time in the future.

FIVE YORKSHIRE student apprentices, who have completed their engineering training with the English Electric Company, Limited, at Bradford, have won the Diploma of Technology. Their success follows five years' training which combined academic study at Bradford Institute of Advanced Technology with practical industrial education in the engineering and production department at the company's Phoenix works.

TECHNICAL REPRESENTATIVES of Atlas Copco (Great Britain), Limited, compressed air equipment manufacturers, etc., recently attended a refresher course at the company's head office at Hemel Hempstead (Herts). At one of the sessions a talk was given by Mr. W. A. McClunie, headquarters tunnelling engineer of the National Coal Board, on future trends in drilling and loading equipment and their effect on high speed tunnelling.

COMPLAINT has been lodged by the Belgian Association of Coal Consumers with the High Authority of the European Coal and Steel Community about price increases by the Belgian coal cartel, Cobechar. The association is requesting prices, inclusive of transport costs, comparable with those of the Ruhr and Limburg. It is also asking for a guarantee for fair prices to be a condition of any approval by the Authority of Cobechar in its proposed new form.

COAL OUTPUT in 1960 by Germany's largest coal company, Gelsenkirchener Bergwerks, AG, was 17,100,000 tons—a fall of 1.4 per cent. on 1959—and coke production rose by 8.3 per cent. to 5,600,000 tons. Unsold stocks of coal were reduced by 840,000 tons to 1,000,000 tons and those of coke by 316,000 tons to 684,000 tons. One pit with an annual capacity of 800,000 tons was closed and two more will be closed in the next two years.

STATE-OWNED Peruvian concern, Corporación Peruana del Santa, has reached a financial agreement with the Overseas Industrial Construction concern, Zürich, by which the capacity of the Chimbote steelworks in Peru will be expanded from 58,000 metric tons to 240,000 tons by 1963. Further expansion planned will later bring capacity up to 500,000 tons. Cost of the first stage of expansion is set at $50,000,000. Main financing of the plant is to be met by the Peruvian Government.

WEST GERMAN steel and rolled wire manufacturers, Niederrheinische Hütte, AG, Duisburg, produced in 1959-60 599,000 (525,000) metric tons of rolled wire, 356,000 (293,000) tons of pig-iron, 442,000 (424,000) tons of Siemens-Martin raw steel, and 221,000 (206,000) tons of iron and steel bars. The company, which is owned by August Thyssen-Hütte, AG, increased its turnover from DM 502,000,000 to DM 603,000,000. Export sales rose from DM 74,000,000 to DM 78,000,000.

PLANS COSTING £1,100,000 will boost Australian production of naphthalene and phthalic anhydride, announces the Broken Hill Proprietary Company, Limited, and the Imperial Chemical Industries, Limited. Broken Hill is installing plant costing over £500,000 to process tars derived from coke oven operations at Port Kembla for the recovery of naphthalene. Jointly owned by the ICI and Broken Hill, the Newcastle Chemical Company, Limited, is doubling the capacity of its phthalic anhydride plant at a cost of about £600,000.

SUBSIDIARY COMPANY has been formed by Elliott Bros. (London), Limited, a member of the Elliott-Automation, Limited, group. The new company—Rotron Controls, Limited—is owned jointly with the Rotron Controls Corporation, New York, US—Elliott Bros. holding a two thirds controlling interest. Rotron Controls will manufacture the range of flowmeters and associated equipment development by the US company for the positive and massflow measurements in the oil, gas, water, and petro-chemical industries. It will sell them throughout Europe, the Middle East, and the Commonwealth (excluding Canada).

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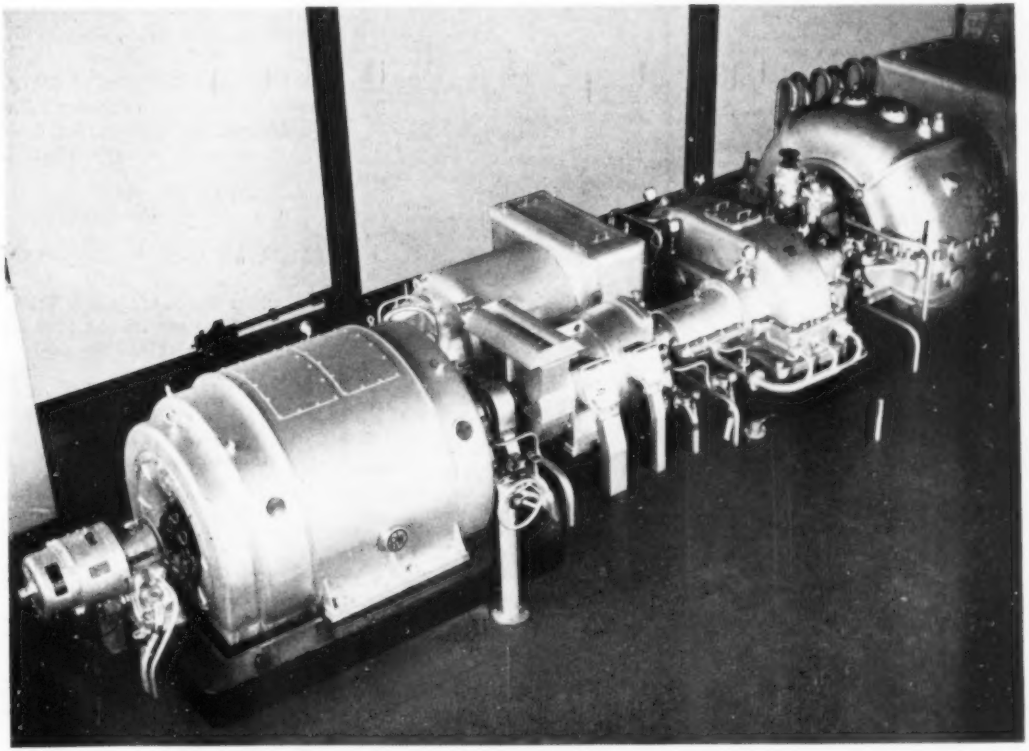

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Advertisements accompanied by a remittance and replies to Box Numbers should be addressed to the Advertisement Manager, Iron and Coal Trades Review, John Adam House, 17/19, John Adam Street, London, W.C.2. If received by first post Tuesday, they can normally be accommodated in the next Friday's issue.

SITUATIONS VACANT

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Forms of Application are obtainable from the Director of Education, County Buildings, Ayr, to whom the completed forms should be returned within 14 days from the date of this advertisement.

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SITUATIONS VACANT—*contd.*

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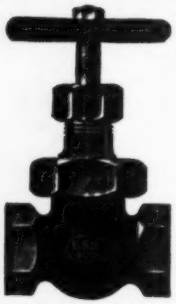

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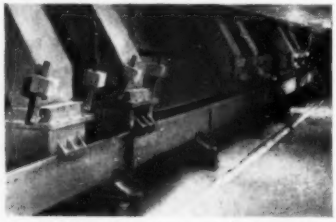

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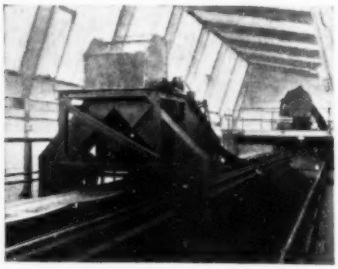

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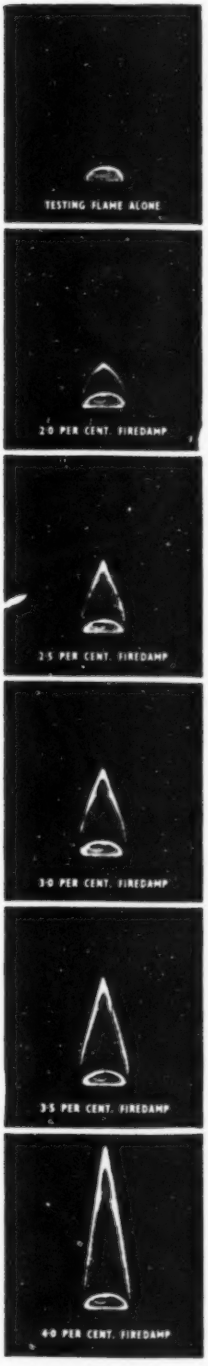

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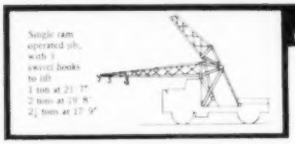

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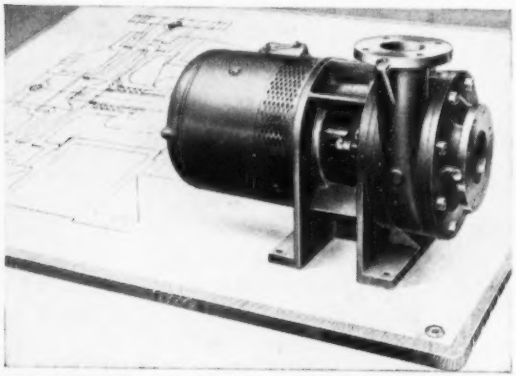

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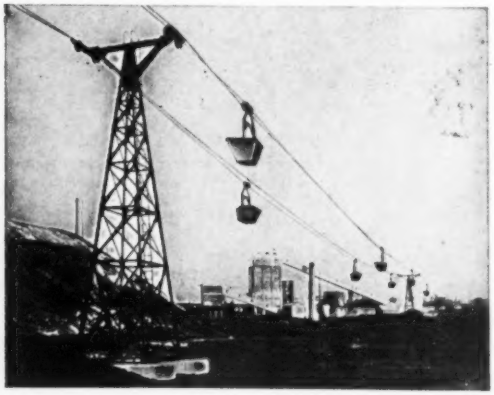

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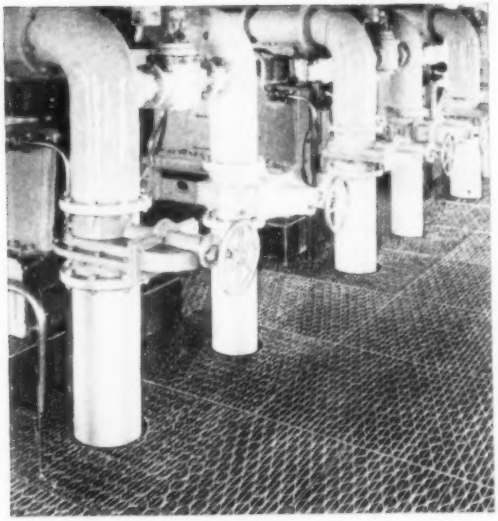

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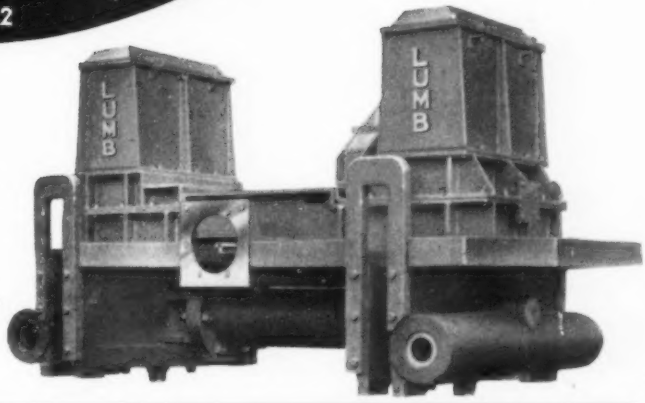

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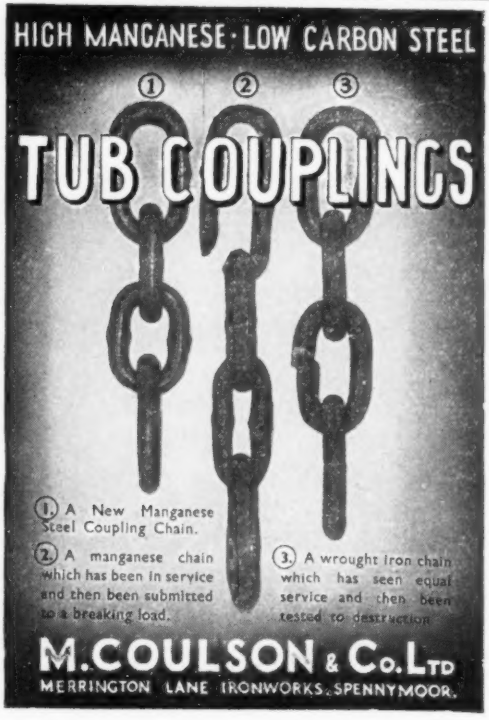
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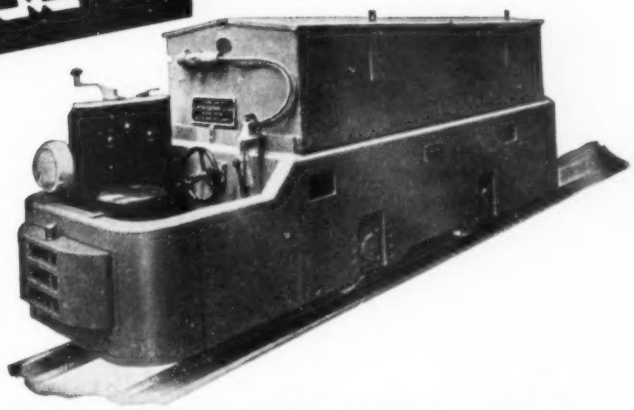

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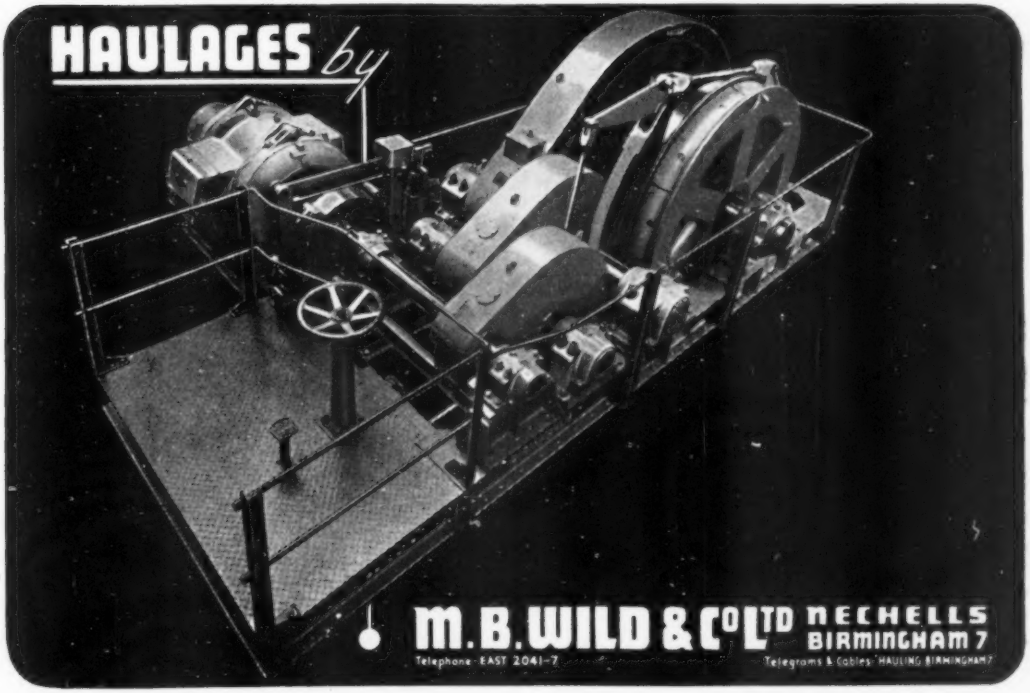

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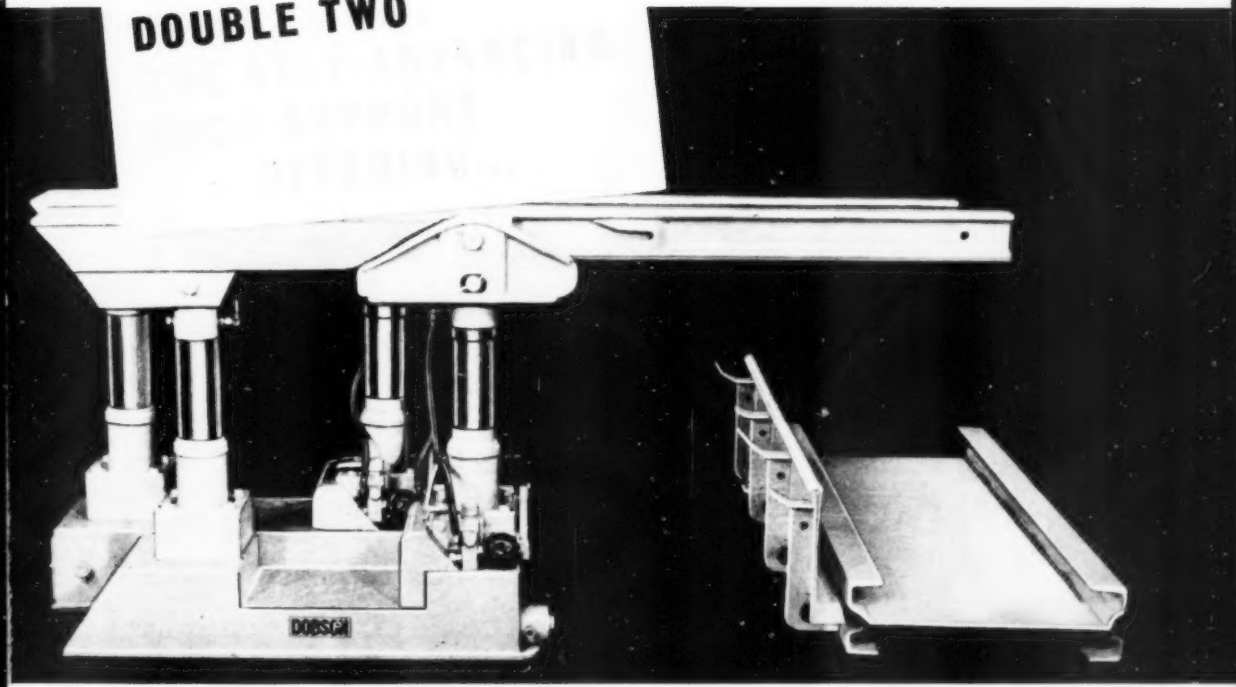

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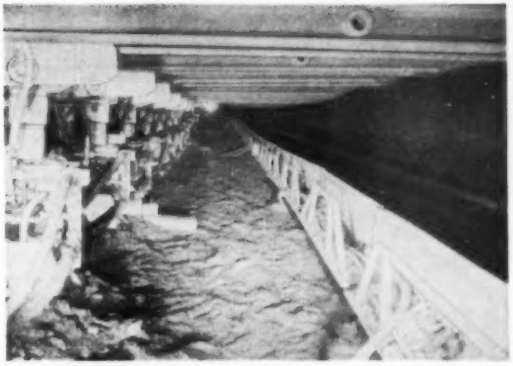

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